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USSR Report

SCIENCE AND TECHNOLOGY POLICY

No. 5

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USSR ACADEMY OF SCIENCES CONFERENCE HELD IN TALLINN

Tallinn SOVETSKAYA ESTONIYA in Russian 9 Jun 82 pp 1-2

[Unattributed article of the Estonian Telegraph Agency: "The Guarantee for Success is in the Coordinating of Efforts"]

[Text] Under the conditions of modern economic development, the problem of providing energy has become one of the most important national economic tasks. Expenditures are growing for mining and transporting fuel and raw materials from remote areas. Many of the new deposits are being developed under unfavorable geological mining conditions.

For this reason it is no accident that the role of fundamental research has increased so in developing the fuel and energy complex of the nation and because of this the importance of the coordinating activities of the USSR Academy of Sciences has also grown.

The session of the Council for Coordinating the Scientific Activities of the Union Republic Academies of Sciences under the Presidium of the USSR Academy of Sciences has summed up the results of the activities carried out by the scientists over the year. This meeting opened on 8 June in Tallinn.

The president of the USSR Academy of Sciences and Council Chairman, Academician A. Aleksandrov, gave the opening speech to those present.

"At present, there is an energetic process underway in the development of science in all of the fraternal republics of the USSR," he said. "The skilled collectives from the republic academies help in creating the overall front of Soviet science. It is possible to give examples where scientific collectives from the republic academies hold leading positions not only in the nation but also in the world.

"One cannot help but note that contribution which has been made by the Estonian Academy of Sciences in solving the problems of the fuel and energy complex. The experience of Estonian scientists in the area of the integrated use of cheap solid fuel is important also for the other republics and areas which are rich in shale deposits."

Then speaking was the First Secretary of the ECP [Estonian Communist Party] Central Committee, K. Vayno.

On behalf of the Bureau of the ECP Central Committee, the Presidium of the Republic Supreme Soviet and Council of Ministers, he warmly and cordially welcomed the participants of the 29th Session of the Council for the Coordinating of Scientific Activities of the Union Republic Academies of Sciences and wished them successful, fruitful work.

Comrade K. Vayno said that the meeting being held in the capital of Soviet Estonia for the scientific leaders of all the fraternal republics during the year of the 60th anniversary of our great multinational motherland is profoundly symbolic. It is still another vivid confirmation of the practical realization of Lenin's nationality policy and the diverse work of the Communist Party and the Soviet government in the area of developing science in the Union republics.

The accomplishments of Soviet Estonia over the last 4 decades clearly shows what heights can be achieved by a republic which is part of the friendly family of fraternal peoples. Today Soviet Estonia is a socialist republic with a dynamically developing industry and agriculture, a developed social structure and high educational and cultural levels of the population. Our republic's economy is a component part of the unified powerful national economic organism of the land. In relying on fruitful cooperation with all the fraternal republics, our republic has come to hold a firm place in the united family of Soviet peoples and in the national division of labor. It has achieved significant advances in increasing its economic and scientific potential and in increasing the well-being of the people. Suffice it to say that at present the republic's economy in 8 days produces the same amount of product as in all of 1940, while the gross volume of agricultural product is double the prewar level, although the number of persons working in agriculture has declined by more than 3-fold.

The republic workers are proud of the high praise which the CPSU Central Committee gave to their achievements in intensifying production at the 26th CPSU Congress. Much has been done in the republic to utilize the local oil shales and to develop the production of electric power, mineral fertilizers and consumer goods.

The republic has gotten off to a good start in the second year of the 11th Five-Year Plan. The industrial workers ahead of time, on 29 May, fulfilled the 5-month plan quotas. More than 38 million rubles of industrial product were produced above the plan, with an annual socialist obligation of 50 million rubles. The growth of labor productivity and the reconstruction and technical reequipping of existing enterprises are a determining factor for the development of the republic's industry.

The rural workers have successfully handled a crucial stage, the spring sowing. The sowing of the spring crops was completed within the optimum times, almost a week earlier than last year. At present, everywhere in the republic we have begun to solve the key problem in the development of livestock raising, the providing of feed. The republic livestock raisers are also hard at work. The rural workers of our republic see their task in implementing the nation's Food Program in intensifying production and achieving an increase in meat and milk. For this reason primary attention is being paid to this in the Food Program being worked out in the republic. The rayon agroindustrial associations must play a major role in solving this. The experiment of creating these associations was approved at the May (1982) Plenum of the CPSU Central Committee.

The May Plenum of the CPSU Central Committee raised responsible tasks for science, Comrade K. Vayno went on to say. We see our task in helping our scientists be up to the high demands and in helping them clearly understand the social significance of their personal involvement in carrying out the party's magnificent plans. Fundamental research and its results create that basis, in relying on which, science can carry out its role of the "disrupter of complacency" and the catalyst of scientific and technical progress. For this reason it is very important that the efforts of scientists, along with elaborating theoretical problems, to a greater degree be concentrated on solving important national economic questions and on discoveries capable of introducing truly revolutionary changes into production. The essence of the question is to more closely tie science to production and to even better introduce the scientific discoveries and inventions. The question was raised in this manner at the 26th Congress of our party and the necessity of this was pointed out again at the May (1982) Plenum of the CPSU Central Committee.

At present specific program research is becoming the mainline of scientific development. Life itself has convincingly confirmed the effectiveness of these programs. The nine programs created by the Estonian Academy of Sciences successfully focus the efforts of the scientists on introducing effective methods for mining and processing oil shales in the aim of supplying the nation's Northwest with electric power, liquid fuel and chemical products. They are also working on the rational use of the Estonian phosphorites, a source of fertility and a powerful means for fulfilling the Food Program, on developing new biologically active compounds, including for medicine and agriculture, and on developing modern high-speed automatic equipment and microprocessor systems to automate production processes essential for scientific institutions.

At present, the republic scientific institutes and design organizations, under the leadership of the Academy of Sciences and in close contact with the Estonian ministries, departments and Gosplan, are carrying out responsible work to draw up the Estonian 20-Year Comprehensive Program for Scientific and Technical Progress. Over the long run, this will become a truly scientific basis for planning our economic and social development. This creates important prerequisites for converting the national economy to an even more intense path of development and for the greatest possible rise in the effectiveness and quality of all our work.

On a national scale the USSR Academy of Sciences plays the main role in developing mutually enriching scientific ties. It in every way possible contributes to the creation and successful operation of the republic academies. From the example of our republic one can see and assess that enormous and complete aid which the USSR Academy of Sciences and the outstanding scientists of the nation, Moscow and Leningrad have given Estonian science.

We have our own Academy of Sciences which presently fruitfully employs around 4,300 persons, including more than 1,100 scientific workers, 80 doctors of sciences and 580 candidates of sciences. The constant coordination of research within the system of all Soviet science and the disclosing of its leading areas accelerate the process of scientific developments which are being carried out in Estonia and they improve their quality. Each year in the reports of the USSR Academy of Sciences scores of projects by Soviet Estonian scientists are mentioned among the most important.

In noticing the successes of our scientific institutions, said Comrade K. Vayno, it is also essential to critically assess their work. The scientific organizations also have unsolved problems and unfinished work. At times, an excessive number of projects and the scattering of resources are observed and there are also shortcomings in coordinating the activities of the scientific institutions. But here the main thing is that our scientists see these shortcomings and take specific measures to eliminate them.

Soviet scientists are on the leading edge of the struggle for communism, Comrade K. Vayno went on to say. They take a most active part in carrying out the party's plans and in strengthening the motherland's economic potential, its defense capability and the material and cultural level of the people. But in the present difficult international situation, when our nation is making an enormous effort to preserve and strengthen peace, the fate of our peaceful life depends as never before upon the increased economic might of the USSR. And this means that the role of science will rise even more and the responsibility of scientists for the results of their labor will grow.

In conclusion, Comrade K. Vayno said:

"Allow me to express confidence that the important matter for all of us of coordinating Soviet science will develop fruitfully in the future. Let the present, 39th session make its weighty contribution to mobilizing the creative potential of our science."

Academician M. Styrikovich, member of the Presidium of the USSR Academy of Sciences, gave a report on the tasks of the republic academies of sciences, the scientific centers and affiliates of the USSR Academy of Sciences in developing research in the area of the fuel and energy complexes.

The significant changes in the development of world energy as a whole, the increasing economicness of replacing petroleum by other energy resources, the carrying out of an energy-saving technical policy by the party and government and the increased demands for preserving the ecological equilibrium and protecting the environment, the speaker commented, determine the direction of research by Soviet scientists. The coordinating of their activities in energy is carried out by the Scientific Council of the USSR Academy of Sciences for interdisciplinary energy problems. However, the work being carried out in the area of the fuel and energy complex, and particularly energy-saving technologies, requires a further improvement in forms and methods.

The President of the Estonian Academy of Sciences, Academician K. Rebane, spoke on the problem of the integrated use of oil shales from the example of Estonia. He pointed out that particular attention should be paid to the process of the heat processing of fine-grained shale in line with the increased mechanization of its mining. He said that even how it is essential to prepare scientifically and technically for the development of a new major national economic sector, that is, the production of liquid types of fuel from oil shales, bituminous sands and coals.

The Vice President of the USSR Academy of Sciences, Academician P. Fedoseyev, told about the preparations of the USSR Academy of Sciences and the Union republic academies of sciences for the 60th anniversary of the formation of the USSR.

The preparations for and holding of the jubilee general assembly of the USSR Academy of Sciences, the division sessions and the enlarged meetings for the scientific councils of the USSR Academy of Sciences institutes as well as other measures devoted to this date have been carried out under the banner of further strengthening the friendship of peoples and successfully developing the creative initiative of scientists.

N. P. Fedorenko, academician-secretary of the Economics Division of the USSR Academy of Sciences, told of the coordinating of economic research in the nation.

A decision was adopted by the Coordination Council which pointed out that the republic academies of sciences, the scientific centers and affiliates of the USSR Academy of Sciences are to carry out significant work in improving the forms of ties between science and production. In the republics plenums have been held by the central committees of the Union republic communist parties, meetings of the party-economic aktivs and joint sessions of the presidiums of the academies of sciences and gosplans on the questions of concentrating efforts aimed at further developing science and accelerating scientific and technical progress in the national economy.

The nation's scientific institutions and VUZes have been involved in drawing up the interdisciplinary plans for scientific and technical progress. We have begun to more widely employ across-the-board planning of scientific research and the introduction of developments on the basis of the joint plans of the ministries and scientific institutions.

The session's decision also pointed out that the Estonian Academy of Sciences has strengthened its work to utilize the republic's scientific potential in the area of fundamental problems. The Presidium of the Estonian Academy of Sciences has outlined and is implementing specific measures to conduct joint scientific research by the republic VUZes and the industrial enterprises on a basis of scientific collaboration contracts.

Participating in the work of the session were Comrades I. Kebin, V. Klauson, A. Kudryavtsev, O. Merimaa, R. Ristlaan, A. Ryuytel' and N. Yuganson, the deputy chairmen of the Estonian Council of Ministers B. Saul and G. Tynspoyeg, the department heads of the ECP Central Committee A. Aben and A. Zamakhin, the sector head of the CPSU Central Committee I. Rozanov, leaders of the republic ministries and departments, party and Soviet workers and scientists.

10272
CSO: 1800/779

DEPUTY CHAIRMAN OF STATE COMMITTEE ON S&T OUTLINES FUTURE PLANS

Moscow KRASNAYA ZVEZDA in Russian 18 Apr 82 p 2

[Article by K. Dyumayev, deputy chairman of the USSR State Committee for Science and Technology: "In Close Union With Practice"]

> [Text] Commemorating their annual holiday--Soviet Science Day--scientists, engineering-technical personnel and specialists of various sectors of the economy are living with an endeavor to make a fitting contribution to the accomplishment of the historic tasks of the 11th Five-Year Plan and the achievement of new heights of scientific-technical progress and to fulfill the requirement of the party heard from the platform of the 26th CPSU Congress: "Together with the development of theoretical problems the country sorely needs the efforts of 'big science' to be concentrated to a greater extent on the solution of key national economic questions and discoveries capable of introducing truly revolutionary changes in production."

A close union with practice is the most characteristic feature of the present stage of the scientific-technical revolution. Truly revolutionary, qualitative changes currently extend to all stages of the single "science-technology-production" cycle. Such unity is both a natural regularity and an urgent requirement and command of the times. This by no means signifies, however, that a firm union of science with production is born of its own accord. On the contrary, the purposeful, coordinated efforts of party and state authorities, scientific groups and ministries and departments are more necessary now than ever in order to make this union effective and fruitful.

For the accomplishment of the tasks set Soviet science by the party congress the USSR Gosplan, USSR State Committee for Science and Technology and the USSR Academy of Sciences have developed 170 programs of scientific-technical progress. Implementation in the current 5-year plan even of 41 of them promises considerable results. In what ways is it planned to increase science's contribution to the development of the economy?

Let us take, for example, the program of the development of the USSR's fuel-energy complex. Even today our country occupies a leading place in world power engineering. It accounts for more than one-fifth of the energy resources

produced in the world. At the same time scientific-technical progress requires the unswerving growth of the power-worker ratio in industry, construction, agriculture and transport. Yet at the same time developing the fuel-energy complex is becoming increasingly difficult. It is necessary, figuratively speaking, to go north and east, to uncharted regions, for fuel. The possibilities of enlisting new hydraulic resources in electrical power engineering needs have been practically exhausted in the European part of the USSR. It is also necessary to improve the structure of our fuel balance and reduce the proportion of oil therein, making more extensive use of natural gas and cheap coals. Much also has to be done for the organization of an "energy transfer" from the extractive regions of the east to the industrial centers in the west of the country. Each of these tasks is connected with the solution of a number of scientific-technical problems.

The construction of AES with units with 1 million and more kilowatt capacity will be further developed in electrical power engineering. The next step in this direction is the creation of large-scale fast-neutron power units like the one that has already been commissioned at the Beloyarskaya AES. Construction of the world's first nuclear TETs combining the generation of electric power and heat has begun. Clearly, each step forward in the sphere of the peaceful development of the energy of the atom is the fruit of the joint efforts of representatives of science and technology and an example of their creative collaboration. The hydropower engineers have concerns of their own. They have to erect high-pressure GES on the rivers of Siberia, the Far East and Central Asia, for which scientists and production workers have to create new economical designs of hydraulic engineering works and machinery.

Strip mining is being performed increasingly extensively in our country. The working of coal deposits of the Kansko-Achinsk type requires the development of new mining equipment and transport facilities, including large-capacity stripping cars with a capacity of up to 180 tons. Ahead lies the question of the organization of the processing of low-grade coals into high-calorie types of liquid fuel and fuel gas and also valuable chemical products. Dozens of scientific groups are conducting research into these problems, and the day when its results are applied in practice is not far off.

Science is faced with the task of developing new technical methods of prospecting for and recovering oil and gas under difficult mining-geological and climatic conditions and from great depths and helping the designers create highly mechanized units and switch to the comprehensive automation of the oil and gas fields.

Oil and gas have not only to be recovered from the interior but also delivered to the consumer, and this needs to be done with the highest productivity and least losses, furthermore. It is planned to increase the throughput capacity of the gas mains by way of an increase in the effective pressure of the gas, mainly with the use of new multilayer pipes. The technology of their manufacture developed by scientists of the Arc Welding Institute imeni Ye. O. Paton will enable us to increase pressure in the gas mains to 100-120 atmospheres, increase their productivity almost 60 percent and at the same time reduce the metal content.

The country's scientific groups are concentrating their efforts on the creation of new materials and also on the refinement of techniques of obtaining those which are traditional in industry and construction. Metallic powders making it possible to obtain high-strength, high-plasticity and heat-resistant materials and exclude smelting and casting processes and to reduce the proportion of machining are being employed increasingly extensively. Continuous processes of obtaining copper, nickel and titanium are being introduced in nonferrous metallurgy. Specialists are successfully finding ways to extract iron and nonferrous metals from so-called pyrite cinders--production waste which is as yet being dumped.

Important tasks are being tackled by the chemical scientists. Many sectors of the economy expect from them synthetic materials which have not been created by nature--materials which are lighter than wood and stronger than steel, resistant to high temperatures and aggressive environments and economical and simple to manufacture. New composition powder materials to which ordinary river sand, chalk, cinder and cement dust are being introduced as fillers correspond to the strictest requirements. The scientists' quest is being directed toward the development of new types of rubber, oil and fuel additives and liquids and monocrystals for various electronic products. "Big chemistry" is also actively invading construction. Cement production by energy-saving methods is expanding here. Together with the traditional building materials increasingly frequent use is being made of plastics, sealing compounds for setting joints between blocks of buildings and so forth.

It is proposed to tackle the problem of compensating for the shortage of labor resources by way of the retooling of industrial sectors. Man has to be replaced by machine, primarily in physically difficult work and monotonous operations and where it is necessary to deal with environments which are damaging to the health. Scientists are helping the engineers raise the level of the mechanization and automation of production processes, and this applies particularly to auxiliary, transport, materials-handling and warehousing operations and also assembly work. The collaboration of science and production has made it possible to organize the manufacture of metal-cutting machine tools with digital program control and switch to the creation of comprehensive mechanized divisions with machine tools centrally controlled by computer.

The sphere of application of automatic manipulators is very diverse: engineering, ferrous and nonferrous metallurgy, chemical, light and food industry, agriculture and transport. New generations of so-called adaptive and intellectual robots with self-adapting control systems will be created and assimilated in the current 5-year plan. The development and adjustment of programs for them is an important task of our mathematicians. How efficient man's replacement by machine in this area of production or the other proves will depend on its solution.

Science is making an impressive contribution to the buildup and improvement of the pool of computers. The country's economy is in need of an increase in the manufacture of controlling computer complexes, peripheral equipment, minicomputer systems based on large integrated circuits and microprocessors with a speed of up to a million operations per second. Territorial centers of the collective use of computer equipment for servicing 100 and more enterprises and organizations each will be created in this 5-year period.

Modern large-capacity and high-speed locomotives, cars, automated track facilities, comprehensively mechanized handling operations--such will be the technical appearance of our railroad transport. Design thought is aimed at an improvement in the structure of the motor vehicle and aircraft fleet and a rise in the operating characteristics of river and sea passenger and cargo ships. And all this is being done to ensure that our transport be even more reliable, productive and economical.

For the purpose of the most successful accomplishment of the task of the public's uninterrupted supply with food products the 26th party congress deemed it expedient to draw up a special food program. And the scientists have to have their weighty say here. The economy expects from them new plant varieties and animal breeds, accomplished agricultural machinery, proposals for increasing fodder productiveness and means of automating animal husbandry complexes.

Processes connected with the plowing of the soil and its presowing cultivation, the sowing of cereals, cotton and sugar beet and also their harvesting are currently practically totally mechanized. And the agricultural pool is being replenished with increasingly new machinery.

Scientific-technical programs are also geared to the accomplishment of such important tasks as an improvement in the quality of consumer goods. Light industry is today equipped with comprehensively mechanized lines, and automated plants will be commissioned in the future. The scientists and production workers have created looms based on the use of hydraulics and pneumatics and microshuttle and shuttleless machines.

The quest of national science has broad horizons and a boundless front. It occupies foremost positions in many fields--from the study of the expanses of space to penetration to the depths of the atom. A tremendous contribution to the building of communism is being made by the social sciences. "On all fronts of communist building Soviet science is doing big things," Comrade L.I. Brezhnev has said. "It is invading production and social life increasingly assertively and changing the way of life of tens of millions of people."

Thousands of scientific and production collectives and organizations and enterprises of essentially all ministries and departments are working with inspiration on fulfillment of the far-reaching plans of implementation of the achievements of scientific-technical progress in practice. Scientists of the union republic academies of sciences are tackling scientific problems by common efforts, endeavoring to commemorate the 60th anniversary of the USSR's formation with new successes in their noble labor. The representatives of Soviet science apprehended wholeheartedly the CPSU Central Committee's May Day Appeal to them: "Soviet scientists! Increase the efficiency of research! May the union of science and production strengthen!"

8850
CSO: 1814/85

THREE SOVIET SCIENTISTS DISCUSS 'POWDER METALLURGY' COMPLEX PROGRAM

Moscow PRAVDA in Russian 18 Apr 82 p 3

[Three part article by V. Trefilov, O. Roman and K. Mitoyan: "In accordance with the Unified Program"]

> [Text] It was noted at the 26th CPSU Congress that "the close integration of science and production is an urgent requirement of the present era." To find ways for the most efficient use of the latest scientific and technical achievements in order to intensify the development of the country's national economy--this is the task facing the specialists of the scientific research establishment and universities.
>
> One avenue of cooperation is joint participation in the implementation of comprehensive scientific and technical programs. During the 11th Five-Year Plan 170 of these state programs are being implemented, including 41 goal-oriented programs. There are also regional and other comprehensive programs in operation, each of them with specific final goals. This kind of cooperation by participants in a single chain for the development and introduction of innovations is making it possible to achieve tangible results.
>
> Today, participants from one of the largest all-union comprehensive scientific and technical programs, the "Powder Metallurgy, Composites and Coatings" program, talk about initial results from their joint work. Academic institutes and more than 200 scientific research and planning and design organizations and enterprises belonging to almost 50 ministries and administrations are cooperating within the framework of this program.

V. Trefilov, director of the Ukrainian SSR Academy of Sciences Institute of Problems of Material Science.

In the unanimous opinion of specialists our country now occupies the leading place in the world in the field of scientific and technical reserves [zadel] in powder metallurgy. The production of parts from powders has increased considerably and the output of specialized crushing-and-mixing equipment, means of automation, presses, kilns and control and measuring instruments is growing. In the present

five-year plan alone large capacities have been commissioned for the production of iron powder at Europe's largest plant in Brovary near Kiev, at a number of enterprises in Dnepropetrovskaya and Donetskaya oblasts, at the "Krasnyy Sulin" plant in Rostovskaya Oblast, the "Tulachermet" scientific-production associations and in Belorussia.

The Ukrainian SSR Academy of Sciences Institute of Problems of Material Science, the country's head institute in the field of powder metallurgy, has developed and confirmed about 15 standard technological processes for the production of articles made from powders of iron, copper and other metals and their alloys, and these are being increasingly applied in the production of structural elements, electrotechnical articles, hard-metal instruments and antifriction materials. Under the leadership of specialists from the institute a number of so-called intergation programs have been developed and implemented for powder metallurgy and will be realized with the participation of the CEMA member countries.

It is important that plans be implemented more actively for broad cooperation by specialists directly with collectives where the latest developments of the scientists are being introduced, namely the Moscow powder metallurgy plant, the Dimitrovgrad automatic assembly plant, and enterprises that produce instrumentation on the basis of powder in a number of other cities in the country.

In particular, industry is increasingly willingly making use of the new superhard material hexanite-R [geksanit-R], which was developed for the first time in the world by specialists at our institute and the Poltava artificial diamond and superhard instruments plant and has now been patented in many countries. The hexanite part of the cutter which, by using the method of the Kiev people, it has been possible to firmly join to the cutting instrument, operates so actively that as a result of sharpening the need for polishing has almost completely disappeared. Labor productivity has been increased a dozen times over.

During the 11th Five-Year Plan the output of hexanite cutters will increase substantially. Collectives producing hard-metal instruments in the Ukraine, Armenia and other regions are already making a major contribution to increasing its production volume. This innovation alone is producing millions of additional saved rubles for the country and releasing thousands of machine tools for other work.

Vast prospects are being opened up by the mass introduction, envisaged by the comprehensive program, of coatings that protect metal articles against corrosion and machine parts from wear. The great effectiveness of the kind of technological operations that will become essential in the future in a number of the most important sectors can be seen from the fact that the efficiency of protected surfaces is increased by a factor of 5 to 10, metal losses are sharply reduced and the weight of machines and equipment is reduced and their reliability enhanced.

O. Roman, general director of the Belorussian republic scientific-production association for powder metallurgy, professor.

In the field of powder metallurgy our association is the first and as yet the only one in the country. Its distinguishing feature is that it has been set up on an

intersector basis. We service enterprises in Belorussia regardless of their administrative subordination. But at the same time we operate within the framework of the all-union goal-oriented comprehensive scientific-technical program. A unified science-through-production chain is being created in order to introduce the results of scientific research as rapidly as possible.

I would like to note that the foundation was laid at the Belorussian Polytechnical Institute. But even though we have become a scientific-production association we have not cut our ties with it. Our association is the head organization for powder metallurgy under the USSR Ministry of Higher and Secondary Specialized Education. And we have found good assistants in a number of institutes in solving the technical problems.

What are the kinds of problems that we have already succeeded in solving? Plastic deformation of porous materials has made it possible almost completely to eliminate metal rejects and to develop an automated line for the fabrication of parts needing a high frequency of dismantling. Porous materials have been proposed for filtering liquids and gases and developing heating pipes. This class also includes porous molds for fabricating porcelain ware. This work has made it possible to develop new structures that are saving more than R1.5 million. Last year alone the savings from our developments have exceed R10 million. It will be substantially more in 1984 when the Molodechno powder metallurgy plant is to be commissioned.

This is the kind of economic return obtained from the leading scientific developments: last year alone personnel of our scientific research institute for powder metallurgy received 150 author's certificates and 9 of our developmentes were patented in the United States, Japan, France, Sweden, England and some other countries.

Of course, we were helped in this by our close ties with other scientific establishments. For example, we are cooperating fruitfully the Moscow Institute of Fine Chemical Technology and the Scientific Rsearch Institute of Tractor and Agricultural Machine Building on the utilization of machining chip waste, and, of course, with the Ukrainian SSR Academy of Sciences head Institute of Problems of Material Science.

K. Mitoyan, general director of the "Almaz" association, Armenian SSR State Prize laureate.

Today, powder metallurgy is essential for the development of diamonds tools. Thus, the method developed at the Ukrainian SSR Academy of Sciences Institute of Problems of Material Science that we have assimilated makes it possible to obtain diamond cutting disks without a steel body. This means that they can operate until they are completely worn out and, moreover, it saves alloyed steel. Instead of bodies pressed beforehand from sheet steel we now fabricate the same tool completely from a powder charge containing diamond. The result is a sharp improvement in labor productivity and reduced consumption of material.

In recent years we have established fruitful contacts with the USSR Academy of Sciences Institute of Solid State Physics. In particular, with the aid of its specialists the design of high-pressure equipment for obtaining blanks of hexanite-R with a diameter of up to 15 millimeters has been improved.

Much could be said about the new composites and tools that have been born out of the creative cooperation with the scientists. These links are strengthening with each passing day. It is particularly pleasing that dozens of institutes in the country are displaying an interest in us. Here, the binding element is the technological laboratories at our plant, staffed with highly qualified physicists, mechanics and chemists and focused on introducing the results of scientific developments into practice.

9642
CSO: 1814/107

RAPID SCIENTIFIC PROGRESS DEPENDENT ON PLANNING, FINANCING AND ECONOMIC INCENTIVES

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 3, Mar 82 pp 70-74

[Article by I. Shpakov, inspector of the Belorussian SSR Committee for Scientific Consultation: "In the Rapids of Scientific and Technical Progress"]

[Text] The country's scientific and technical potential has grown considerably in recent years. An extensive network of scientific research and planning and design organization and about 900 higher educational establishments, where more than 1.3 million scientific and scientific teaching personnel work, is engaged in fundamental and applied scientific research and development. Each year allocations for the development of science and technology from the state budget exceed R20 billion.

Within the national economy of Belorussia science has become a major sector.

The acceleration of scientific and technical progress is being substantially promoted by the activity of the production and scientific production associations and use of levers such as the new system of financing and economic incentive for work on new technology. During the 10th Five-Year Plan in our country some 20,000 highly productive machines, instruments and other equipment and various materials were developed and 17,500 of them were put into production. More than 60,000 mechanized and automated lines were introduced at enterprises and about 25,000 shops and sections were comprehensively mechanized and automated. According to USSR Central Statistical Administration figures, by 1980 the use of scientific and technical achievements alone had made it possible to make about 500,000 workers redundant, including a considerable number of those engaged in loading and unloading operations. Almost 90 percent of the increase in industrial output and the entire growth in agricultural production were obtained through improved labor productivity during the last five-year plan.

In order to reduce the time periods for the development of new equipment and technology in especially important directions in the development of the country's national economy more than 150 comprehensive scientific and technical programs have been drawn up for the period 1981-1985, including a number of goal-oriented programs. They are aimed at resolving scientific and technical problems of an intersector nature and the cover all elements of the "science-through production" cycle in the fields of the fuel and energy and agrarian-industrial complexes, machine building, chemicals, metallurgy, transportation, the production of consumer goods

and so forth. These programs are coordinated with production plans and capital construction in the corresponding sectors; provision has been made for fully insuring material and labor resources for the tasks during the period of development and introduction. Hundreds of scientific and planning organizations and design bureaus and production facilities are participating in the implementation of the programs.

At the same time, analysis of the activity of scientific organizations and enterprises shows that a number of serious shortcomings are hampering the efficient utilization of the available scientific and technical potential. Individual subdivisions and even entire scientific organizations do not carry full responsibility for the final results of the work they do. Fundamentally new decisions are lacking in many developments. Each year almost one in five of the scientific and design organizations of the industrial ministries do not complete developments at the level of inventions. For various reasons a number of scientific collectives are delaying research and failing to meet the time periods laid down by the plan for developments, as a result of which practical application of the results of their work is being delayed and the output produced by industry is being renewed only slowly.

An active attitude by people's control groups and posts acquires special significance in raising the effectiveness of science under present conditions. As is known, the law on people's control in the USSR has reinforced the legal basis of their work, considerably extended their powers and enhanced their role and authority. The task is to make each group and each post proceed in its daily and varied control work from a Leninist approach to the organization of checks: control should be objective and carried out not for its own sake but for the purpose of correcting a state of affairs, and the people actually responsible for shortcomings that are permitted should carry the responsibility. The attention of inspectors should be focused on checking the fulfillment of state plans, which constitute the concrete expression of party economic policy and an organized basis for the struggle to implement it.

Party and government decrees on improving the economic mechanism have strengthened the orientation of plans for the development of science and technology at all levels on the long-term, future goals of economic and social progress in the country. During the 10th Five-Year Plan the transfer of scientific research, planning and design and technological organizations, scientific production associations and the production collectives of the industrial ministries to the cost-accounting method for organizing work to develop, assimilate and introduce new technology was completed. This has made it possible to interest collectives much more in achieving high final results, producing high quality output, and saving raw material, fuel and energy and material resources.

The "schedule-order" system has now become the basic form of intersector regulation of the relationships between science and production. This system is applied in all planned, goal-oriented developments connected with the development of articles, materials and technological processes and it has the legal force of an economic contract between the parties. Within the system a staged complex of developments is planned, for research and development through to the final result--introduction into the national economy. The schedule-order determines the dates for completion of the stages, funding, with the sources specified, who is to do the work and the

enterprises at which the goal-oriented development is to be completed. Planned technical and economic indicators, including the calculated economic effect, are also determined in accordance with the final results.

The transfer to the new system with the use of the schedule-order system has already been approved in several industrial sectors. Their practical work shows that start-to-finish planning on this basis positively affects reductions in the "research-through-production" lead time. Thus, as a result of the measures implemented the time periods for developments and their introduction into production have been shortened in the electrotechnical industry by 20-40 percent, by 30 percent in machine building and so forth. The proportion of highest category output has grown.

However, the introduction of an improved system for planning scientific research and planning and design work does not presuppose a weakening of control. On the contrary, the tasks determined by the most important subjects should be under the intent control of inspectors. And this is understandable since the tasks set are those having a complex intersector character, whose uncompleted or undercompleted fulfillment by one of the organizations leads to derangement in the work of other related scientific, design or planning collectives. Paramount significance attaches to research and development aimed at reducing the consumption of fuel, energy and raw material resources.

Control over the fulfillment of a subject-based plan in a scientific research organization or a comprehensive plan for retooling and employing new equipment at an industrial enterprise begins as a rule by clarifying the opportuneness and correctness of tasks passed to sections and laboratories and of the specific executors. It is important to establish the availability of reports or technical documentation on the final themes and their concordance with the work programs confirmed and the calendar periods for their completion. Here, dates are fixed for state registration of subjects when they are included in a plan, together with the avenues confirmed by reports on work completed at the State Committee for Science and Technology All-Union Scientific and Technical Information Center. It is essential to bear in mind that a scientific-technical development is considered completed and accepted '(that is, the plan is completed) when the appropriate tests of new machines, mechanisms or other articles, or the technological processes have been conducted by departmental and interdepartmental commissions or the clients, who adopt the necessary recommendations on the assimilation and utilization of the developments.

Checking in matters connected with the development and introduction of the achievements of science and technology and leading equipment in the national economy should be initiated with a study of the report figures on cutbacks in manual labor at the enterprise. Fulfillment of plans for the introduction of new equipment is assessed from the main indicators for the technical level of production and labor. These include the proportion of manual labor, the status of mechanization and automation of production processes, indicators for the machine/worker ratio and the power/worker ratio, the level of standardization of the articles produced and so forth.

Indicators on plan fulfillment for new equipment are shown in the statistical report (form No 10-NT "Report of a scientific-production or production association

(or combine) or industrial enterprise on expenditures on measures for new equipment and their economic effectiveness"). When checking their trustworthiness it is essential to be guided by the USSR Central Statistical Administration instructions on the compilation of these reports. In addition, when checking figures on reduced production costs, enhanced capacities, labor productivity and return on investment, and increased profit and profitability, it is essential to use the "Report on development and introduction of new equipment" (form No 2-NT), and also form No 10-NT. Increased labor productivity is shown in form No 2-T (factors). Increased production capacities are shown in form No 04-TP for the technical industrial final plan "balance of production capacities and their utilization," and figures on savings of raw materials on form No 12-SN. Figures on the utilization of manual labor must be given in the "report on a production association (or combine) or industrial enterprise on the numbers of workers in main and auxiliary work engaged in manual labor and in work with hard labor conditions" (form No 2-T-MT).

When checking report figures on the economic effectiveness of measures, the calculation should include only actual figures for the amount of output produced, reductions in production costs, specific capital investments and so forth.

Plan fulfillment and the effectiveness of scientific developments by specialized planning and design and scientific research collectives are checked by means of clarifying the correctness of the completion and reliability of indicators in the "report on fulfillment of scientific research and design and technological work" (form No 2-NT, NPK, annually). It is expedient to clarify whether or not subjects excluded from the thematic plan have been included in the report and to insure that documents are available that confirm the completion and introduction of developments, along with the correctness of the calculated economic effect.

The validity of amendments to plans for science and technology deserves careful study. In some scientific establishments and enterprises the practice of altering the thematic plan in order to reduce plan indicators has still not been eradicated. Most amendments (usually at the end of a quarter or year) nullify the plan as a directive document and lead to a weakening of state and planning discipline. Moreover, amendments create the illusion of well-being and frequently provide the leaders of organizations with an opportunity to receive illegal bonuses.

The people's control groups at many enterprises and scientific establishments have gained positive experience in checking the fulfillment of thematic plans and in helping the leaders of organizations and party organizations to raise the level of state and planning discipline.

The inspectors of the Minsk tractor plant are doing purposeful work to check on the fulfillment of plans for new equipment. Through their efforts, for example, cases of nonobservance of time periods for the completion of work and commissioning of new equipment and violations of the technology for producing the equipment were revealed. The use of imported equipment is under special control. The plant managers take operational steps according to the results of the checks.

The inspectors of the Minsk automobile plant are effecting control over the output of test batches of new models of trucks and light vehicle trailers, and the setting up of new equipment. They recently completed two planned checks on the fulfillment

in production facilities and shops of measures for a comprehensive retooling plan. Consideration of the results of the checks in the people's control committee at the Minsk Automobile Plant helped the plant management to eliminate the shortcomings that were revealed.

On the proposal of the people's controllers at the Bobruysk "Belarus'rezinotekhnika" production association, the commissioning of mechanical racks for drying flexible-tube articles was accelerated. As a result, working conditions were improved and output quality was enhanced.

People's controllers at the Belorussian automobile plant, the Ordzhonikidze instrument plant and other enterprises in the republic have achieved positive results in checking on the fulfillment of plans for new equipment and measures for comprehensive retooling plans.

The quality and depth of scientific research and the results from scientists' work depend largely on the provision of instruments and apparatus for the scientific establishments. The rational utilization of equipment--full up-time and the creation of centers for collective use--is a matter of great state importance. A soliticious attitude toward apparatus and its timely repair and inspection are also of some significance.

Checking on the introduction of completed developments is a basic question in the control work of groups and posts. Here, a determination is made of the actual state of affairs concerning the use of completed developments as envisaged in the documents at various levels.

The efficacy of checks done by the committees is rather better if they are carried out jointly or in contact with the people's control groups. There are many examples of this kind of joint work. Thus, inspectors at the Minsk automobile plant, the Gomel' starting engine plant, the Borisov assembly plant, and the Lida agricultural machine plant, jointly with the BSSR People's Control Committee have checked on the fulfillment of work to introduce the achievements of science and technology and progressive technology into production. Steps taken by the managers of these enterprises as a result of the checks have made it possible to substantially accelerate the resolution of many production tasks and to eliminate shortcomings. Positive results have also been obtained from checks at the Mogilev Planning and Design Technological Institute for Technologic Equipment and Automation and Mechanization, the Bobruysk state specialized planning and design bureau, the Minsk specialized design bureau for automation of technological processes, the Ministry of Tractor and Agricultural Machine Building "Ritm" scientific-production association and many others.

Those people's control groups are acting correctly that analyze the reasons for delays in the practical use of results from the activity of scientists, designers and planners, and that try to give their attention to every completed development.

Each year the state allocates considerable sums to acquire models of new equipment from abroad on the orders of the institutes, for subsequent development of more progressive or improved machines, instruments and equipment. The checks, show, however, that not all models purchased in recent years are being used as they

should be. Many scientific organizations are delaying testing or simply not doing it at all. In a number of cases unsubstantiated recommendations are being made for the purchase of such models. As a result, some of the models have not been recommended for reproduction after testing.

People's control groups and posts can substantially influence the timely and qualified conducting of the necessary work provided for in the regulations with regard to the study and use of progressive foreign equipment. Of no less importance is the organization of control over the introduction of recommended equipment in production.

It should be noted that the transfer to production of developments that are extremely efficient in terms of their content but without adequate design and technological work on test models leads to loss of time in industrial assimilation and excess expenditures of assets and labor. The accelerated introduction into the national economy of new scientific and technical developments is largely determined by the availability in scientific organizations of experimental test production facilities and by their capacities and up-to-date equipment.

Another important aspect of the matter is the rational utilization of existing test bases and production facilities. Checks show that in many cases they are engaged in the production of series-produced output, while testing of completed scientific and design developments is somehow pushed into second place.

The pursuit of gross indicators sometimes prompts the managers of experimental production facilities to increase the cost of experimental models, which distorts the economic indicators for the work of scientific organizations as a whole.

Effective control over the status of the construction of experimental bases and their work load, and systematic checks on the financial and economic activity of these subdivisions can substantially accelerate the introduction of new equipment at the stage of the development of test models or technological processes.

A broad field of activity is being opened up for people's controllers in connection with the transfer of the scientific organizations of the industrial ministires to the cost-accounting system for organizing work on the development of new equipment. Bonus funds for new equipment and technologies should now formed mainly from the actual economic effect obtained as a result of the use of specific scientific and technical measures. The system of material incentive for scientific and technical progress is based on cost-accounting principles that insure enhanced effectiveness in the development and introduction of leading technology into production.

The economic effect of new equipment should be planned at the stage of formation of the thematic plan. Through control, it is important to clarify whether the intended economic effect has been achieved. Comparison of actual return with that envisaged by the plan through the planned indicators makes it possible to assess the soundness of the technical policy being pursued by a scientific organization. And this in turn helps to introduce corrections in good time, improve predictions taking into account the specific conditions in which equipment is operated, and thus remove the barriers against its introduction into production. In other words, the actual calculation of the return from new equipment plays a role as a unique kind of feedback mechanism.

Checks show that distortions are often permitted in determination of the economic effect. In some cases when several organizations are participating in work, no determination is made of the share made by each one of them but total economic effect is allowed for the aktiv of each organization. Frequently the calculated or planned effect is substituted for the actual effect. In such cases equipment that is in reality obviously unsuitable is passed off as efficient equipment. During checks it is essential to analyze the documents confirming that the calculated economic indicators from the use of equipment, technology or material have in fact been achieved. Here, analysis of the legal competence of the documents presented and their correct formulation in accordance with the established procedure (acts of introduction, protocols for production tests, calculations of the economic effect acutally achieved) should not be neglected.

One crucial stage in the control work of inspectors is checking the correctness of the formation of material incentive funds, proceeding from the actual effect achieved by introduction. When examining the procedure for the distribution of material incentive funds, the practicability of incentive should be evaluated taking into account that the extent of remuneration should correspond to the personnel creative and business contribution made personally by each worker.

The procedure established for organizing the work of scientific establishments is not being observed everywhere. There are establishments, for example, whose structure does not comply with the "general provisions on scientific research, design, planning and design and technological organizations." The management at institutes frequently includes in its structure subdivisions the nature of whose work cannot be designated as scientific. Nevertheless, the workers in these subdivisions illegally receive benefits envisaged only for scientific staffs. Thus, what is in essence a planning section, which should be part of the administrative apparatus, can function under the name of a scientific organizational section. They are frequently set up as scientific organizational-introduction subdivisions.

The people's controllers at academic institutes and also at higher educational establishments should make a quite important contribution to the acceleration of scientific and technical progress. In the checks that are carried out all groups and posts should participate actively with the aktiv of scientific workers, designers, engineers and workers at test production facilities. This work should be built up on the basis of extensive publicity: results of checks and steps taken should be brought to the attention of the labor collectives with the aid of the press, special people's control exhibits, closed-circuit radio broadcasting and various kinds of meetings.

People's control groups and posts are the reliable aides of the party organizations and they can do a great deal to enhance the effectiveness of research and development and successfully solve the tasks of scientific and technical progress.

9642
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POLYTECHNICAL VUZ REORGANIZATION NEEDED TO UPGRADE GRADUATE QUALIFICATIONS

Moscow PRAVDA in Russian 5 Apr 82 p 3

[Article by S. Sergeyev, professor at a polytechnical institute and doctor of technical sciences: "Engineering Universities"]

> [Text] Odessa--Among the country's engineering VUZ's a special place is occupied by the polytechnical institutes. Their distinction lies in their multiprofile nature: personnel in many specialties is trained here, and enrollment for each of them is small, as a rule. Such a circumstance would appear to be beneficial for both the educational institution and its students since it makes it possible to perform extended individual work with them and take their aptitudes and singularities of personality into consideration. But in recent years we have come to observe that the polytechnic students have increasingly often been ceding the "palm" to their comrades who have graduated from specialized VUZ's.

It is generally recognized that the modern engineer must have not only a high level of training in the fundamental sciences but also know his own specialty to perfection and be able to make use of general theoretical knowledge in tackling concrete tasks of modern production. But this can only be achieved if the graduating departments possess large-scale science-production and educational facilities furnished with the latest equipment making it possible to conduct research with respect to industry's most urgent demands.

More. In addition to high scientific and pedagogical qualifications the lecturers of general theory and general engineering departments should know to a sufficient extent the specific features of the sector for which the engineers are being trained. The students would then be able even in the first-second courses to tackle in the scientific groups tasks of a theoretical nature connected with the future specialty. And when theory is "embodied" by the art of applied decisions, habits of creative thinking are born in a young person which enable him to get his bearings independently in professional information.

Yet the existing structure of the polytechnical, industrial and other multiprofile VUZ's is seriously complicating the training of engineers in accordance with modern requirements. In our institute, for example, tuition of the students is conducted in 25 specialties. The enrollment for each of

them is 50 persons on average. And this means that in accordance with the norms of the pedagogical work load the specialist departments are small: only 5-6 lecturers and 1-2 laboratory assistants may work in them simultaneously. And, moreover, every lecturer has to present two-three lecture courses each.

All this makes the organization of classes difficult and lowers the quality of tuition. At the same time the need for lecturers, while seemingly justified, is in fact artificially overstated, and it is becoming increasingly difficult to equip special laboratories for certain courses and provide them with laboratory personnel. It is practically impossible to achieve the comprehensiveness of scientific research and establish lasting and firm relations with industry and scientific establishments.

The academic councils of the faculties, which are made up of specialists of various profiles, are incapable of discussing in depth the scientific problems confronting the specialist departments.

An extremely difficult situation in our institute, for example, has taken shape in the material-handling equipment and chemical engineering departments. Up to eight special disciplines are lectured on in each of them, but the number of appointed staff lecturers is only five each, including assistants who do not have the right to present lecture courses. How can a normal educational process, not to mention research, be organized under such conditions?

In attempting to preserve these specialties the dean's office decided to liquidate the "machinery parts" department and split its work load evenly between two lecturer groups which "bore the disaster". But things did not get any easier: there was an immediate deterioration in the students' general engineering training.

How, then, to ensure that the polytechnical institutes begin to correspond to their purpose of engineering universities?

Let us turn once again to practice. Our institute has an automotive transport department, which trains engineers in the "automotive maintenance and repair" specialty. The enrollment for this specialty in the highway institutes constitutes 250-300 persons, and there are separate engine, body, repair, maintenance and so forth departments. Understandably, the quality of tuition is higher under such conditions.

Many other examples could also be cited. The most striking is the graduation of engineers in the "engineering technology" specialty. Here in the Ukraine 25 VUZ's situated at a distance of 100-200 kilometers from one another are training such specialists. If this is right for Khar'kov--this is, after all, a major engineering center--the "dispersal" of tuition in VUZ lecture halls of Ivano-Frankovsk, Sevastopol' and a number of other cities of the republic is in no way justified.

The time has come, we believe, to reexamine the number of specialties in the multiprofile VUZ's and reduce their number thanks to substantiated reallocation among educational institutions. Let us assume that the training of motor

transport specialists could surely be concentrated in one or two institutes, selecting, naturally, those which already have experienced lecturers and material-technical resources. Clearly, this is no easy matter, but ultimately will be more efficient and profitable than the opening of new VUZ's, faculties or departments.

In our institute the most favorable opportunities have taken shape for the graduation of specialists in the sphere of material-handling engineering, machine-tool building, machining technology and automated control systems. Scientific research process stock has been created and there are pretty good material-technical facilities here. In addition, related industrial enterprises and scientific research organizations, creative collaboration with which is already bearing fruit, operate in Odessa.

For each of these specialties we should enroll not 50 persons, as is the case now, but 200-250, which will enable us subsequently to create strong faculties. Clearly, it will at the same time be necessary to pass on to other VUZ's personnel demands with respect to the other sectors.

It is obviously far easier in large-scale, clearly specialized VUZ's to link the interests of different specialties, consolidate the streams and achieve the efficient use of the lecturer personnel. It is also easier under such conditions to create strong departments in the fundamental and general scientific disciplines. This is very important because a rapid change in the list of manufactured products and their constant complication and increased qualitative characteristics is becoming a typical feature under the conditions of the scientific-technical revolution. For this reason the specialist, the commander of production, also must possess high professional flexibility and an ability to adapt to the new conditions and be capable of undergoing appropriate retraining in a short time. A reflection of this requirement is the increased role and relative significance in the VUZ curricula of general educational and general scientific courses conducted in accordance with a uniform plan for individual faculties and specialties. This practice is contributing to the students' acquisition of the necessary knowledge in the sphere of the fundamental sciences and the broadening of their outlook and making it possible, where necessary, to quickly fit into related spheres of science and technology.

For this reason it is also necessary that the union and republic ministries of higher and secondary specialized education undertake a comprehensive streamlining of the structure of the polytechnical VUZ's. Big potential is contained here, I believe, for an improvement in the training of future engineers.

8850
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INTEGRATING VUZ MORE EFFECTIVELY INTO RESEARCH-PRODUCTION CYCLE

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 4, Apr 82 pp 43-44

[Article by G. Korzenko, postgraduate student at the Belorussian SSR Academy of Sciences Institute of History, and V. Biryuk, senior engineer in the standards and research station at the Belorussian Technological Institute: "The VUZ in a Complex With the Training Scientific-Production Association"]

> [Text] In solving urgent national economic problems great significance attaches to the efficient utilization of the technical and scientific potential of the VUZ's, where almost half of the country's doctors and candidates of sciences are concentrated. On this plane interesting experience has been gained in our republic. Here, for a number of years training scientific-production associations [UNPO] have been operating. Further development of this promising form of link between VUZ science and production will depend largely on the depth of study and generalization of experience and analysis of the main avenues of cooperation.

Ten training scientific-production associations have been set up on the basis of the Belorussian Technological Institute imeni S.M. Kirov. Their activity covers virtually all the subdivisions of the VUZ together with republic enterprises such as the Belorussian tire combine, the Gomel' chemical plant, the Novopolotsk protein and vitamin concentrate plant, the "Azot," "Minskstroymaterialy" and "Vitebskdrev" production associations, and enterprises of the Belorussian SSR Ministry of the Forestry Industry. Some 2,290 people, including 13 doctors of sciences and professors, 252 candidates of sciences and 2,025 students, and more than 300 engineering and technical workers and employees, are now participating in the work of the institute associations.

The UNPO's are social formations set up on the basis of creative cooperation and economic contracts. Proceeding from the specific nature of the VUZ, they are solving many important tasks. These include the training of qualified specialists, conducting joint scientific research and test and design work, developing and creating models of new equipment and accelerating its introduction into production, using equipment and production areas to organize scientific research and the training process, enterprise participation in the strengthening of the material-technical base of the institute and so forth.

What, then, has been the actual return from these kinds of complexes? First the system of long-term planning for the training of engineers and conducting scientific research has been improved. Institute plans are now drawn up for extended periods with the participation of councils from the associations and the administration of enterprise partners. Second, production-process engineers have been afforded an opportunity for making extensive use of scientific experimental, laboratory and production base of the industrial enterprises. For example, equipment and instruments at the central plant laboratories of the "Bobruyskshina" and "Vitebskdrev" production associations, the biosynthesis shops at the Novopolotsk protein and vitamin concentrates plant, and the test and experimental base of the Scientific Research Institute of Construction Materials and the "Minskproyektmebel'" scientific-production associations are used for training and scientific purposes. The "Bobruyskshina" production association has passed on to the institute departments equipment worth R115,000. The Grodno "Azot" production association and the Minsk gypsum plant have are providing much help in terms of materials, instrumentation and equipment.

They say that an engineer is born at the plant. There is some truth in this. However, the future specialist also obtains practical skills within the walls of the VUZ along with the knowledge required for his future work. Within the framework of the training scientific-production associations, for example, particular attention is given to the development of scientific and technical creativity in students. The vice-chancellor's office and the party and Komsomol organizations and councils of the associations are trying together with the enterprise workers to optimize the training process. Thus, on the orders of various organizations, in 1 year alone students completed almost 350 courses and diploma projects. Some work is distinguished by its originality and the novelty of the solution. For example, the diploma work of N. Lapa, a student in the faculty of chemical engineering, "A project for redesigning the separator for extracting natural gas from oil" was introduced at the "Azot" association. At this same enterprise an installation for evaporating ammonium sulfate, developed by student N. Novikov, was tested. The diploma projects of M. Gabrelyan and S. Lunchuk have been used at the "Borbruyskshina" production association.

Cooperation is being fruitfully developed between the departments of "machinery and apparatus for chemical production facilities" and the Grodno "Azot" production association within the "Bureau of Technical Information--'Azot' Production Association" complex. As long ago as 1970, on the initiative of the first graduates E. Levdanskiy and A. Karpovich, a laboratory was set up at the enterprise for the introduction of new equipment, and this operates in close contact with the sector laboratory in the department. Students participate in experiments and develop and fabricate test models. The utilization of innovations during the time that the laboratory for the introduction of new equipment has been in existence has produced for the association savings in excess of R3 million.

Another example. Since 1977 within the "Bureau of Technical Information--'Vitebskdrev'" association a "student post of scientific and technical progress" has been in operation; it is engaged in the development and introduction into production of attachments for sharpening saws equipped with superhard materials.

Organization of the associations has exerted a marked effect, seen in the increased volume of economic contracts. Compared with 1976 the volume of financing has grown 40 percent, totaling R274,000. Last year, for example, the institute collective completed 18 sets of scientific research work and 37 contracts for creative cooperation. Moreover, more than half of the work done fell within the coordinated plans for the sector ministries and the Belorussian SSR and USSR academies of sciences.

It is also important that the associations make it possible to concentrate the efforts of VUZ scientists and plant specialists on solving specific production questions. Thus, within the framework of the "Bureau of Technical Information [BTI]--'Minskproyektmebel'' Scientific-Production Association" there is participation by the VUZ departments for articles made from wood, wood-working machine tools and instruments, and automation of production processes, and the problem scientific research laboratory for modifying wood. In turn, the plant and planning sections for standardization and technical and artistic design help the institute to conduct its scientific research work more effectively. Many departments pool their efforts in the "BTI--Belorusles," "BTI--Mikrobioprom" and "BTI--'Azot' Production Association" complexes. Recently, an insulating system for tire mixes was obtained at the "Bobruyskshina" production association as the result of research. Introduction of this innovation brought the association R219,000 of profit. At the Rechnitsa hydrolysis plant they have started to use tanning waste to great advantage to obtain furfurol. A new technology for producing slack wax as a hydrophobic additive in wood-fiber sheeting (the "Vitebskdrev" association has not only improved the quality of the sheeting but also made it possible to obtain a return of about R7 of profit per ruble of costs.

What kind of potential is there for improving the effectiveness of this kind of link between VUZ science and production organizations? Analysis of 6 years of operation by the institute associations shows convincingly that, first, these kinds of alliances with small enterprises are not promising. In most cases it is more expedient to create sector training scientific-production associations that include major enterprises, scientific research institutes and plant laboratories. Second, the business is hampered by poor utilization in the national economy of the developments of the VUZ scientists. On the one hand the innovations frequently do not reach the level at which it is possible to evaluate their economic effect. And on the other hand, a low level for the scientific research base at individual enterprises sometimes fails to provide opportunity for realizing the importance of developments, and it delays their introduction.

As is known, within the framework of the UNPO's scientists cooperate with plant specialists on the basis of economic contracts. Consequently, the development of technological processes and testing are done directly at the plants, and this often disrupts the production rhythm and impairs output quality. In our view, there is now a need for the training scientific-production associations to set up their own test-and-experimental bases where scientists and students, along with plant specialists, could work on developments until they are brought to the stage of readiness and introduction. Moreover, when creating new enterprises and reconstructing existing enterprises it is essential to make provision for a certain modest reserve in capacities such as would enable the assimilation of new equipment and technologies without harming the plan; and it is also essential to reconstruct in good time those production facilities that maintain production at its present level. These questions are not new but their resolution is being unjustificably delayed.

The important problem of how to improve the process of training highly qualified specialists also remains unresolved. Organizing the departments or their branches at the enterprises with which the institutes are cooperating makes it possible to bring the specialist as close as possible to plant conditions. This kind of experience has been gained within the republic. Two departments of the Belorussian Polytechnical Institute, namely "Large Trucks" and "Wheeled Tractors," have been set up at the Minsk automobile and tractor plants, and the department "Computer Systems" of the Minsk Radiotechnical Institute has been set up at the Minsk production association for computer equipment. Branches of the departments of semiconductor physics, radio engineering and electronic physics of the Belorussian State University imeni V.I. Lenin are operating at the "Integral" production association. In 1981 the "BTI--Minskproyektmebel'" association saw its own "first sign": a branch of the department for technologies of wooden articles with a training course of 480 hours was opened. Lectures, practical and laboratory work, and diploma and course planning will take place there. However, this useful initiative has still not received the backing it deserves. The full value of the training course is being held back by the lack of premises, essential equipment, lack of staff and difficulties in paying for labor. We think that the Belorussian Ministry of Higher and Secondary Specialized Education should resolve these questions jointly with the interested enterprises.

9642
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INFORMATION DISSEMINATION KEY TO INDUSTRIAL PROGRESS

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 3, Mar 82 pp 49-52

[Article by T. Tursunbayev, director, KazNIINTI, and I. Krykbayeva, chief, institute scientific methods department: "Accelerating Agent of the New and Advanced"]

[Text] Acceleration of the pace of scientific and technological advance is inconceivable without extensive employment in the nation's economy of the latest advances in science and technology, particularly discoveries and inventions. A far from insignificant role in this important matter is played by an extensive scientific and technical information service, which has the job of informing numerous consumers about new developments which offer prospects of increased efficiency of societal production.

The Basic Directions of Economic and Social Development of the USSR, ratified by the 26th CPSU Congress, state the task of improving the system of scientific and technical information and patent-licensing work. The Kazakh SSR Council of Ministers and Gosplan, which have the job of organizing this work in this republic, devote considerable attention to development of information on inventions and study of this information by specialists at scientific research organizations, design organizations, and enterprises for development of new equipment and industrial processes on a high scientific and technical level.

Last November a republic conference was held in Alma-Ata, dealing with problems of improving the system of patent information, invention and patent-license work. It was organized by KaSSR Gosplan and KazNIINTI [Kazakh Scientific Research Institute for Scientific and Technical Information], jointly with the republic councils of the Scientific and Technical Society and the All-Union Society of Inventors and Efficiency Innovators. A total of 350 experts from all fields took part in the conference, at which 33 papers and summary reports were presented.

The conference examined questions connected with boosting the scientific and technical level of research projects, development of a network of patent files in this republic, and legal protection of inventions abroad.

An essential condition for raising the level of scientific research work is conduct of patent-information investigation at all stages. Prompt and timely

supplying of information on inventions to developers of new equipment in turn depends on organization of a network of patent files and an information system on inventions.

The Kazakh SSR patent information system (RSPI) is one of the regional components of the state patent information system (GSPI). All its activities are directed toward accomplishment of the following basic tasks:

decision-making on development of scientific and technological progress by republic administrative agencies;

execution of major specific-purpose combined programs pertaining to scientific-technical, economic and social development of the Kazakh SSR;

securement of patentability, a high scientific and technical level, and competitiveness of new research project results.

In order to handle such important tasks, a patent information system should meet present-day demands, its files should be of specified completeness and depth, adequate for the conduct of a full patent search, while the reference system of the files should provide for all types of search. Also essential is a precise system of information both on current additions to the files, as well as review search on consumer request.

Another important condition is the availability of patent documentation services and specialists in analysis of patent descriptions and information synthesis.

There has been established in this republic a well-structured and precise patent information system. Its principal components include territorial files and files specialized by branch. A total of 133 files have been formed, with a total volume of 25 million documentation units, including the basic republic patent file in Alma-Ata, a branch file in Ust'-Kamenogorsk (All-Union Scientific Research Institute of Ferrous Metallurgy), and 18 territorial files, consisting of reference-information files of oblast scientific and technical libraries (ONTB), and 113 narrow-specialization patent files of enterprises and organizations. Average annual documentation issue totals 6.5 million units. The file circulation factor is 0.4. This is one of the highest figures in the country.

The RSPI, with the assistance of the patent files of intersectorial territorial scientific and technical information agencies, serve 7000 group subscribers and issues approximately 35,000 replies to inquiries each year.

The principal base for patent-license work and all types of search is the republic patent file (RPF). It contains patent documentation from 42 countries, including complete descriptions of inventions in 25 countries. In addition, the RPF each year serves approximately 3000 enterprises and 2500 individual subscribers, issuing approximately 4.5 million documents. Each year 120-140 persons study documentation at the RPF.

Patent documentation of 18 oblast scientific and technical libraries totals 7 million units. These collections contain descriptions of inventions from the USSR and CEMA countries, as well as listings of inventions in the leading capitalist countries which are patent cooperation agreement members (United States, Great Britain, France, FRG, Japan, Switzerland).

Alma-Atinskaya, Vostochno-Kazakhstanskaya, Karagandinskaya, and Chimkentskaya oblasts are the best provided with patent documentation. We should note that these four oblasts account for 75.2 percent of the total volume of patent documentation in this republic.

At the same time not all territorial patent files meet today's requirements as regards composition and depth of representation. This assuredly prevents specialists from performing full patent searches, while a lack of modern copying and duplicating equipment makes it impossible to organize adequate patent information service to specialists even on the basis of existing files.

Only 10 percent of the total number of organizations which maintain narrow-specialization patent files possess sufficiently full patent documentation. Incidentally, these organizations have an adequate reference and search staff, specialists in filing by subject matter, current and long-range acquisition plans. They of course provide efficient conduct of all types of search.

In ministries and agencies of republic subordination, patent files as a rule are made up at branch scientific research institutes located in Alma-Ata. Enterprises and organizations of these branches which are located in other areas have practically no patent documentation, and at the same time do not use the services of territorial patent files.

The lack of patent documentation in certain areas of the republic and its insufficient utilization by enterprises and organizations has an adverse effect on the level of their new research projects and invention activity performance.

The primary agency in the patent information system in this republic is KazNIINTI. It furnishes enterprises and organizations with information in accordance with their requirements, draws up proposals on improving and further developing the RSPI, coordinates the information activities of all components of the system, and performs methodological work with NTI [Scientific and Technical Information] agencies. A special place in the activities of KazNIINTI is occupied by providing information support for major specific combined projects and programs pertaining to the scientific-technical, economic and social development of the Kazakh SSR.

Since 1976 more than 600 enterprises and organizations have received comprehensive information service on 10 intersectorial economic problems. This year information support has been organized for all specific-purpose combined programs and programs pertaining to solving major scientific and technical problems, execution of which involves the participation of enterprises and organizations located in the Kazakh SSR.

Comprehensive information service includes all forms and methods of communicating information to the consumers, the most important of which are selective dissemination of information, replies to subscriber inquiries, and preparation of recommendation information.

Each year the institute and territorial TsNTI [Scientific and Technical Information Centers] send consumers more than 500,000 documents as selective dissemination of information.

In order promptly to utilize scientific and technical advances in the nation's economy, the institute and TsNTI draw up and disseminate recommendations on the most effective inventions and efficiency innovator proposals and provide enterprises with technical documentation on request.

Assembly of special thematic files has been organized at KazNIINTI, the territorial NTI centers and 12 base NTI entities of this republic's ministries and agencies, to provide information support for scientific research and experimental design projects being carried out in this republic on major economic problems. Since 1980 the institute has been supplying information to 450 subscribers on 2230 topics, in automated mode, from IPADOK magnetic tapes. Presently the file on machine-readable media totals 950,000 units.

Much is being done by the patent services of ministries, agencies, enterprises, and organizations to ensure patentability, a high scientific and technical level, and competitiveness of new research results. Patent studies are being efficiently performed at academy institutes, at a number of higher educational institutions, and at enterprises of the KaSSR Ministry of Nonferrous Metallurgy.

We should acknowledge, however, that in many scientific research and design organizations this important business is at the present time not being given adequate attention. In Vostochno-Kazakhstanskaya, Aktyubinskaya, Pavlodarskaya, Karagandinskaya, and Chimkentskaya oblasts, only 70 percent of scientfic research and experimental design project topics were covered by patent investigations. It is apparently only for this reason that less than 50 percent of topics were handled at the level of inventions. This state of affairs is caused to a significant degree by a lack of patent files on the basis of which full patent investigations could be performed.

Our institute became a participant in six national scientific research projects on the program of development of the state patent information system. We supply all enterprises and organizations in this republic with guideline and methods materials of the USSR State Committee for Inventions and Discoveries, while for patent services we hold methods seminars, information days, patent expert days, patent literature exhibits, and consultations.

In order to increase the effectiveness of the activities of the republic patent information system and its individual components, plans call for conducting in the current five-year period studies on improving the structure of the RSPI and organization of interaction between NTI agencies and patent services to provide patent-information support for scientific research and

experimental design projects conducted in this republic on major economic problems. In 1982-1985 work will be completed on drafting a statute on the RSPI as a component of the state system of patent information and methodological documents regulating the forms and methods of functioning of the principal elements of the system.

Plans call for establishing base territorial patent files in Pavlodarskaya and Karagandinskaya oblasts. Patent information departments organized at six of this republic's TsNTI have already begun the extensive job of putting together files on those economic problems which are most important for Kazakhstan.

KazNIINTI is presently establishing a data bank on magnetic tapes containing bibliographic information on inventions. This year the capabilities of the institute's automated information system will increase substantially in connection with installation of a YeS-1045 computer. We plan to establish at KazNIINTI an automated service providing selective copying of descriptions of inventions to order for this republic's enterprises and organizations. This will make it possible substantially to improve the efficiency of societal production.

3024
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DEVELOPMENT OF REGIONAL COMPLEX S&T PROGRAMS

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 4, Apr 82 pp 73-78

[Article by Doctor of Economics V. Arkhangel'skiy, chief of a department of the Moscow Institute of Economic Planning: "Methodological Questions of the Development of a Regional Comprehensive Program of Scientific-Technical Progress"*]

[Text] The CPSU Central Committee and USSR Council of Ministers decree on an improvement in the economic mechanism provides for the formulation in the system of state plans of economic and social development of a comprehensive program of scientific-technical progress in the most important sectors of the economy and regions.

Regional comprehensive programs make it possible to tackle the problem of the coordination of sectorial and territorial interests and on this basis make rational use of local resources and, primarily, scientific potential for increasing social production efficiency. These programs reflect the socioeconomic requirements of the country and a region in the long term and the possibilities of their satisfaction thanks to implementation of the achievements of science and technology. For this reason the structure of the regional program is such that it incorporates the main sectors of the economy: industry, science, agriculture, the fuel-energy and raw material complex and the consumer and municipal service system.

The regional comprehensive program should embrace all levels and stages of the development of science and technology and provide for direct relations and feedback between scientific-technical programs and continuity of the plans. It is essential that organizational and economic methods of management not only be organically combined in a system of measures but also be underpinned by the appropriate organizational forms and mathematical tools providing for the high quality of the control of scientific-technical progress in the social production of the country and the region. Part of a regional program is a forecast of socioeconomic development (for the region as a whole and for sectors and the main economic indicators) providing for the achievement of the levels of social development planned in the country.

*As a discussion.

The main content of a comprehensive program is the development of long-term scientific-technical policy in the economy of the region providing for the intensification of all sectors of the national economy, the maximum use of scientific potential and economies in resources. Importance is attached to resource limitations in the preparation of regional programs inasmuch as the scheduled volume of production and the rate of economic growth are coordinated with the possibilities of their provision with labor, material and energy resources, capital construction, development of the infrastructure and so forth.

Scientific-technical policy proceeds from principles reflecting the essence, goals and conditions of scientific-technical progress in a region. One such is the principle of national economic efficiency. It means that the final results of implementation of a regional program which have been applied in the national economy must not only fully reimburse society for its outlays but also secure the planned rate of economic and social progress. The sectorial structure of R&D is determined, relations between sectors of social production and science--the developers and consumers of scientific results--are organized and problems of the realization of the achievements in the region are tackled in accordance with this. This principle forms the basis of the methods of controlling the programs which are employed and evaluating their efficiency.

The next principle is that of the efficient use of the region's resources. Proceeding from this principle, the volume and structure of labor and material expenditure on fulfillment of the programs are determined and the need therefor and the possibilities of their realization thanks to regional sources are balanced; proposals on the program's financing and material-technical supply are developed; and the capital investments in the works assimilating the innovation are determined. Measures are also prepared for an improvement in the organization of the control of scientific-technical progress. They apply to the planning, financing and coordination of program research and the organizational and economic mechanism of the acceleration of scientific-technical progress in the social production of the country and the region.

The third principle is the interregional division of labor at the time of development of the program. The effective development of science on the basis of this is possible only given lengthy and stable regional scientific relations necessary for joint research, the fulfillment of interregional scientific-technical programs, the mutually profitable exchange of scientific-technical information or the results of research, the reciprocal training of skilled scientific personnel and so forth.

Not only the main areas of the development of science in the region and the use of results, anticipated and achieved, but also the possibilities of the introduction of scientific-technical achievements obtained in other regions as a consequence of joint research and the exchange of scientific-technical information in bilateral or multilateral cooperation are examined at the time of the development of comprehensive regional programs.

The main content of the regional program is determined as a result of the optimum coordination of several factors. Among these are:

specialization of the national economy with regard for the interregional division of labor and the sectorial structure of the region's economy. Account should be taken here of the forecast changes in the structure of social production in the long term, which are prepared by the corresponding scientific-technical measures, and the possibilities of effective commodity exchange;

the evolved specific features of the development and the specialization of the scientific complex of the region and the scientific-technical process stock of both fundamental and applied research carried out at a world scientific level and contributing to the development of certain scientific fields and sectors of material production; and experimental-design developments and their results in the form of new equipment bearing the Symbol of Quality and technology introduced in social production or being prepared for introduction;

the region's natural and climatic conditions;

the material-technical facilities of the scientific organization providing for the high scientific level of research and scientific personnel of the requisite specialization and qualifications;

society's social need for achievements of science and technology forming an order for the scientific complex whose fulfillment constitutes its contribution to the development of the economy. Society's requirements are a most important factor of the development of the comprehensive program of a region; and

the economic possibilities of the state and the region in providing the entire set of programs with labor, financial, material-technical, energy and other resources.

A leading place in the program is occupied by problems of the development of the scientific complex, which is intended to cater for future scientific-technical progress in social production. The purposeful development of a region's scientific complex and the development of its optimum sectorial structure based on the factors adduced earlier, with the envelopment of the network of scientific organizations incorporated in the ministries and departments and with regard for the labor resources and material-technical facilities which they use, are possible given the existing division of labor among the country's regions and the prospects of its improvement in accordance with the Master Plan of the Development and Location of Production Forces. Until now this structure has evolved spontaneously, in the main.

In optimizing the sectors of the structure of a region's scientific complex we can proceed from the following propositions. The scientific organizations in a region serve production both within its confines and beyond. This means that the structure of the scientific complex will depend on production's need for scientific-technical achievements. At the same time increasingly great significance is attached in the determination of development prospects to consideration of the restrictions brought about by the shortage of the main types of resources of the region and the need for their efficient use.

An important part is played by the regional science-intensiveness coefficient in an evaluation of the sectorial structures of the economy of a region and its scientific complex in accordance with the methods instructions of the State Committee for Science and Technology on the procedure of the development and specification of a comprehensive program of scientific-technical progress. It is measured by the correlation of the expenditure of labor or material resources on production in this sector of the economy (ministry of department) on the other and on the corresponding scientific research. In connection with the fact that there is a trend toward the concentration of science in the big and, particularly, the biggest cities this coefficient should be greater than one.

For an analysis of the scientific complex of a region importance is attached to a study of the distribution of research assistants per sector of social production (ministry) and their level of qualifications. The latter may be measured by the correlation of the proportion of research assistants of a given sector employed in the economy as a whole and that of those working in the region (K). A comparatively big value of the index points to the sector's insufficient provision with scientific personnel. For example, in Moscow organizations of the USSR Academy of Sciences are better supplied with scientific personnel (K=0.9) than industry (K=1.04), transport (K=1) and public utilities and housing-municipal services (K=1.1).

A principal factor determining the progress of science is the amount of the appropriations for the development of its branches. As is known, the amount thereof is determined by proceeding from the number of problems being developed and the scale of the research being conducted in the region with regard for the allocation of resources for various scientific fields.

As in the determination of the sectorial structure of a region's scientific complex, in the sphere of scientific specialization it is necessary to use the method of the establishment of localization indices. The basis of it is making the proportion of expenditure on scientific research in the branch of science for the country as a whole and in the given region commensurate.

For an analysis of the prospects of the development of the sectorial structure of the regional scientific complex retrospective and current information about it is insufficient. It is essential to additionally evaluate the quality and prospective nature of the research and also the availability of theoretical process stock in the branches of science. The latter is evaluated by a comparison of the number of theoretical works prepared by the region's scientists in the corresponding branch of science over a number of years with the number of those employed in the scientific complex. These works include publications in books and journals, speeches at scientific conferences and symposia and registered R&D being handled by the region's scientific organizations.

The quality of the R&D is characterized by the number and proportion of copyrights, inventions and discoveries of the region's scientists and also the number of theses defended in approrpiate subjects. The number of them per person employed in science may be regarded as an analytical indicator.

It is possible with its help to determine the significance of the R&D being tackled in a region in this branch of science or the other.

For studying the quality of the scientific field it is necessary to employ the mechanism of the construction of probability distribution schedules (Gaussian curves). The priority field would be considered that in which the number of publications per scientists in the region exceeds the number of similar publications in the country as a whole.

The material-technical component of a region's scientific complex includes the totality of scientific and scientific servicing organizations and their material-technical facilities--fixed capital (passive and active)--and the extent of their provision with production space, instruments and equipment. A high capital-worker ratio points to developed material-technical facilities of the sectorial scientific complex. Thus the capital-worker ratio in scientific organizations of the USSR Ministry of Power and Electrification is twice that of instrument making and almost three times that of electrical equipment industry. This points to the high technical level of organizations of the USSR Ministry of Power and Electrification, which creates favorable conditions for high-quality scientific research and experimental design.

In determining the sectors of the structure of a region's scientific complex under current conditions it is necessary to take account of the national economic results of R&D. Two types of results may be distinguished; socioeconomic and scientific. Let us dwell on the first of them. They are determined by the economic efficiency of the introduction of the achievements of science and technology in a region and the social consequences of scientific-technical progress secured by the region's scientific complex as a result of research conducted in accordance with the regional syllabus. The value of the indicator of economic efficiency is measured by the relation of potential overall savings to expenditure on scientific research and experimental design.

The method of rank correlation (with determination of the total number of ranks per ministry) is used to evaluate the conformity of the ministry scientific complexes' specialization to the requirements of the national economy. The corresponding ministry indicator is ascribed a place (rank) depending on its relative value. The summary evaluation of a ministry's rank is obtained by a summation of the ranks of the corresponding indicators.

Fulfillment of the comprehensive program of the scientific-technical progress of a region and the development of its scientific complex depend directly on the provision of the scientific organizations with resources. The territorial administrative-economic bodies have to formulate a policy of providing the sectors of the region's economy with resources conforming to its possibilities and contributing to high national economic efficiency. For this reason important components of the elaboration of a region's development program are determination of the paths of the economic growth of its scientific complex, determination and substantiation of the rate of change of the main indicators of the progress of science and an evaluation of the anticipated end socioeconomic results.

The economic indicators of the development of a region's science used in forecasting must consider sufficiently fully factors determining its dynamics in the long term:

volume of the consumption of resources and its efficiency;

fruitfulness of the development of the region's science and use of the achievements of science and technology in sectors of the national economy of the country and the region; and

material-technical facilities of the region's science.

The purpose of the development of an economic forecast is an overall economic description of the subject with a comparison of the expenditure of basic resources and anticipated economic results. Maximization of the anticipated economic and social effects under the conditions of the strict regulation of the labor resources employed in science and scientific servicing and the regulation of unsatisfactory consumption thereof thanks to the provision of financial, material, energy and other types of resources serve as a criterion of the optimum state. Choice of the optimum version of a forecast is made with respect to the main economic indicator of the development of social production --an increase in the national income or net product thanks to the economic effect derived from the introduction of new equipment and technology.

The economic forecasting of the development of science is geared to a determination of the growth trends of a region's scientific potential. It pursues a dual goal. On the one hand evaluating and envisaging the economic results of scientific-technical progress and the possibilities of the fullest use of the anticipated achievements of science and technology and an increase on this basis in social production efficiency. On the other, determining the volumes of basic resources (labor, material, financial) necessary for the development of the scientific potential, with regard for their optimum structure and interchangeability. The aggregate of a region's scientific organizations is viewed as a certain macrostructure with common economic parameters.

For example, the average annual growth rate of the number of those employed in Moscow's scientific organizations constituted 3.6 percent in the Ninth Five-Year Plan and 1.8 percent in the 10th. An analysis has shown the impossibility of the preservation of the evolved growth trends of the number of those employed in the science and scientific servicing of the city and the need for the adoption of active measures to reduce the. A goal-oriented comprehensive program to increase the efficiency of the use of labor resources was developed in 1980-1981 in Moscow for this at the initiative of the Moscow Gorkom and Moscow Gorispolkom with the participation of all ministries and departments with scientific complexes in the city.

As a result of having obtained the objective requirements of Moscow's scientific complex a trend toward a change in numbers providing for their stabilization by the year 2000 was formulated.

The forecasting of the need for resources for 20 years ahead can be done for a small group of interconnected indicators. Some of them are adopted for argument, others serve the function of primary indicators. The following are adopted as central economic indicators of a forecast: the number of those employed; current expenditure on scientific research and experimental design; the fixed capital of the scientific and scientific servicing organizations; capital investments; and the economic effect in terms of the totality of scientific research and experimental design. Furthermore, in the development of a forecast additional use is made of the following reference indicators: the capital- and equipment-worker ratio; expenditure per person employed in the scientific sphere; average monthly wage; and economic efficiency of the development of science in the region.

The strain on the balance of labor resources presupposes in science, as in other spheres of the national economy, the development of labor-saving directions based on an intensification of scientific labor. For this reason the number of those employed, which represents the resource with the greatest limitation, is what is most important in forecast calculations. The more so in that the problem of the development of forecasts of labor resources for the country as a whole and individual regions has been solved methodologically, and there is considerable experience of their practical use.

The number of those employed in science and scientific servicing is determined by proceeding from the rational distribution of labor resources between the production and nonproduction spheres providing for the optimum rate of the region's socioeconomic development. In recent years the rate of growth of the numbers of those employed in science has considerably surpassed the corresponding indicators in other sectors of the national economy, although it has now slowed somewhat. It can be assumed that in the next 20 years its increase will constitute 0.1-0.3 percent annually, while in a number of regions with a particularly acute demographic situation the numbers of those employed in science are stabilizing.

Expenditure of live labor determined by the wage fund and past labor (material outlays) are distinguished in the structure of current expenditure. Certain correlations in the structure of the estimated costs of scientific research are additionally determined to calculate overall current expenditure. The basis of the calculation is determination of the average wage of those employed in the sector by proceeding from general socioeconomic forecasts of an improvement in Soviet people's well-being.

There is increased significance in the provision of R&D with equipment under the conditions of the intensification of the development of science. An analysis of the level that has been reached and the trends of changes in the capital- and equipment-worker ratio of scientific labor shows that science's need for technical facilities is not being satisfied in full.

In developing a forecast scientific labor's provision with fixed capital is characterized by the capital-and equipment-worker ratio indicators. In determination of the volume of fixed capital account is taken of the need for the

tooling and retooling of research assistants with more accomplished technical facilities and the creation for them of new jobs at a high technical level in accordance with the forecast numbers of those employed.

The indicators of the material component of a region's scientific potential are determined with regard for their development in the base period and the trends of changes in connection with the policy of the intensification of the progress of science which is being pursued. The capital-worker ratio of scientific labor is determined on the basis of available information concerning its level which has been reached and is forecast in world practice, proceeding from the actual possibilities of its achievement in connection with the development of scientific instrument making and an effective correlation between the expenditure of live and embodied labor.

The total volume of fixed capital of a region's scientific complex in the forecast period is calculated on the basis of the dynamics of scientific labor's capital-worker ratio. In the development of the forecast fixed capital and capital investments are regarded as functions of the numbers of those employed in the scientific and scientific servicing sectors and the capital-worker ratio of their labor. The increase in the fixed capital indicator is determined by the volumes of capital investments (with regard for the time factor) and the lag between capital expenditure and the commissioning of new fixed capital. An accelerated growth of fixed capital is assumed in the forecast period, which makes it possible to compensate for certain limitations in labor resources. This growth will be achieved predominantly thanks to the retooling of the scientific organizations and their additional provision with modern technical facilities and laboratory equipment.

It is expedient to regard the capital-worker ratio of scientific labor as the availability of passive and active fixed capital. The provision of research assistants with passive fixed capital may be calculated by proceeding from the production space provision norms. It currently amounts to approximately 7,000 ruble/men. Insufficient provision with production space compared with the norm and a forecast of a change in the numbers of research assistants could serve as the basis for determination of the volume of capital construction. Labor's active fixed capital availability is determined on the basis of an analysis of the level thereof which has been reached and which is anticipated at the end of the forecast period and with regard for the need for a considerable increase in labor productivity in the sphere of science and technology. For example, Moscow anticipates over the next 20 years a considerable increase in scientific labor's active fixed capital availability.

It is important in determining the volume of capital investments to draw attention to the need for the plan-based renewal of the material-technical facilities of the scientific organizations. For this it would be advisable to establish for the latter a higher-than-usual level of the depreciation of active fixed capital. This would make it possible to replace laboratory equipment more frequently, which would ensure its high technical level.

The economic results of scientific-technical development are reflected in the anticipated savings. In accordance with the accepted methodology of

calculations, the main indicator of economic efficiency is the national economic savings per R1 of expenditure. The trends of a change therein may be determined on the basis of the average efficiency that has been achieved with regard for possible measures for an increase therein.

The overall value of the savings is defined as the product of economic efficiency and current expenditure. Great significance is attached to an increase in the reliability of the calculations of savings inasmuch as shortcomings in the methodology of the determination of the economic efficiency of scientific research and experimental design lead to the low dependability of these calculations with respect to stages of the "research-production" cycle. The data of a survey of results of the activity of Moscow scientific research organizations show that the correlation of the anticipated and actual savings of scientific research and experimental design constitutes 3:1. The national economy incures considerable material losses as a result. Instances of the development of insufficiently efficient subject matter of scientific research and experimental design are frequent, but the main thing is that the existing methodology does not provide for the possibility of planning the savings from the implementation of scientific-technical measures.

A methodical solution of the problems that have been posed makes it possible to switch from an evaluation of the largely potential economic efficiency of scientific-technical measures to substantiated calculations, whose purpose is to bring the anticipated indicator levels closer to the actual levels and also characterize the impact of science on economic growth.

The introduction of the procedure of the computation of the economic efficiency of the use in the national economy of new equipment; inventions and efficiency proposals has contributed to the establishment of a uniform approach to an evaluation of this indicator. But this procedure takes insufficiently into account the specifics of determination of the savings and efficiency of R&D at the initial stages. For this reason it needs amplification.

Primarily, the procedure fails to indicate the subject which would serve as a base for an evaluation of the economic efficiency of the R&D. This requirement, which is satisfied automatically upon calculations of the anticipated savings at the stages of the assimilation and introduction of new equipment or the actual savings, gives rise to certain difficulties at the scientific research stage. To increase the overall value of the savings and efficiency of R&D the scientific organizations at this stage, as a rule, examine the possibility of the extensive dissemination of the anticipated results in the national economy of the country or, at least, in the sector, that is, calculate the potential savings.

Thus according to the procedure, the maximum savings and upper limit of efficiency possible under ideal conditions of the dissemination of scientific-technical achievements are determined. And, of course, incorporating the thus obtained value of the effect of scientific research and experimental design in the long-term plans of the economic development of production is risky.

The first condition of an increase in the reliability of economic evaluations of the results of scientific research and experimental design is the determination at early stages of R&D of the actual consumer of the innovations and the actual volume of their introduction. This would make it possible to determine the developer's guaranteed minimum savings which would be derived by the national economy at projects of the priority realization of the innovations. As a result the savings calculated at early stages of scientific research and experimental design would be brought closer to the actual savings, which would provide for the possibility of their planning with regard for the specified time of the completion of research and the introduction norms. With an expansion of the scale of the innovation the estimated value of the savings would change only in the direction of an increase.

The second condition of an increase in the reliability of economic evaluations of the subject matter of R&D is a refinement of the methodology of the determination of expenditure on scientific research and experimental design and economic effectiveness in the form of the value of the savings per R1 of expenditure. Upon determining economic efficiency at the initial stage of scientific research and experimental design it is essential to take account of the production expenditure of the coming period connected with the assimilation and introduction of the anticipated results in social production. Without this, the estimated value of economic efficiency is overstated. The calculation of economic efficiency with respect to the specific projects scheduled for priority introduction facilitates this task. In this case the reliability of the evaluations depends mainly on the choice of the period of the determination of the savings and expenditure and also on the method of their comparison.

In order to determine the degree of influence of the development of a region's science on social production efficiency the savings should be calculated as as those anticipated from the introduction of the results of R&D in the country's national economy and their use in the region. For forecast calculations the overall value of the savings of scientific research and experimental design in the overall national economic savings may be distinguished proportionate to their share determined in the base period and with regard for the structural changes planned in the region's scientific complex as a result of realization of the program of scientific-technical progress.

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ESTONIAN PRIZES COMMISSION SEEKING NEW S&T PAPERS

Tallinn SOVETSKAYA ESTONIYA in Russian 30 Apr 82 p 3

[Text] Works submitted for 1982 Estonian SSR prizes in the sphere of science, technology and production will be accepted through 10 July of this year.

Material should be addressed to the ESSR Commission on Prizes in the Sphere of Science, Technology and Production, Lossiplats 1, 200100 Tallinn.

Information may be obtained by telephoning 606-781.

ESSR prizes in the sphere of science, technology and production are conferred for scientific research which makes a major contribution to the development of national science; for work on the creation and introduction in the economy of the most progressive materials, machinery and mechanisms; for new highly productive production processes; for the creation and introduction of new forms and methods of management; for the introduction of progressive production-technical experience of great national economic significance; for outstanding successes in work scored in socialist competition; for original and economical technical installations; for in-depth theoretical research in questions of state and economic building and Marxist-Leninist science and also for the creation of outstanding textbooks for higher and secondary specialized educational institutions, the high school, vocational-technical educational institutions and for the system of party training and economic education.

Given major new achievements by a winner of the ESSR Prize, this prize may be conferred on him a second time, but the submission for a subsequent award may not be made until 5 years following the preceding award.

Works for ESSR prizes in the sphere of science, technology and production are submitted by the ESSR Academy of Sciences Presidium, scientific and scientific-technical societies, ESSR ministry boards, ESSR state committees and departments, the Estonian Republic Union of Consumer Societies Presidium, the Estonian Komsomol Central Committee, scientific research institutes, design and planning organizations, VUZ's, publishing houses and meetings of association, enterprise, establishment and organization labor collectives.

The simultaneous nomination of one and the same work or one and the same candidate for the ESSR Prize, the Lenin Prize and the USSR Prize and also for USSR Council of Ministers' prizes is not permitted.

A collective submitted for the ESSR Prize should include only the main leading persons whose creative contribution was the most outstanding. The inclusion in collectives of competitors of persons only for administrative and organizing work is not permitted. The number of competitors must not exceed 12.

For extensive preliminary public discussion of the works submitted for ESSR prizes in the sphere of science, technology and production scientific works and textbooks are nominated for prizes following their publication in the press not earlier than 1 year, and engineering-technical installations, inventions, machinery designs, new materials, production processes and improvements in production methods are nominated for prizes following their introduction in the economy.

8850
CSO: 1814/86

ARMENIAN ACADEMY OF SCIENCES ANNUAL MEETING

Yerevan KOMMUNIST in Russian 28 Apr 82 p 2

[Article (Armenpress): "Horizons of Scientific Quest"]

[Text] In the 11th Five-Year Plan the development of science and technology should be focused to an even greater degree on solving the major problems of further advance of the Soviet society and acceleration of transition by the economy to intensive development. As was emphasized at the 26th CPSU Congress, science should be a constant "disturber of tranquility," showing in which areas stagnation and lag have occurred, and where the contemporary level of knowledge offers the opportunity to move forward faster and more successfully. The scientists of Soviet Armenia view as their principal job the unswerving execution of tasks assigned to them by the 26th CPSU Congress and the 27th Congress of the Armenian Communist Party. This was discussed at the annual General Meeting of the Armenian SSR Academy of Sciences, which was held on 27 April in the Academy's conference hall.

Opening the meeting, Armenian SSR Academy of Sciences President Academician V. A. Ambartsumyan stressed that the principal objective of scientific and scientific-organizational activity of the republic Academy in the preceding year had been execution of tasks proceeding from the first year's plan and subsequent prospects of the 11th Five-Year Plan for development of the national economy. The points and conclusions contained in the decisions of the 26th CPSU Congress and the 27th Congress of the Armenian Communist Party, as well as in party and government decrees, were of exceptional importance for further boosting the level of performance by the work forces of scientific establishments and other subdivisions of the Academy of Sciences. Proceeding from the most important tasks assigned to science, the organizations of the Academy have drawn up scientific research plans and have detailed the principal directions of their investigations.

The interests of further development of the national economy demand a high level and quality of scientific research projects and accelerated adoption of research results. And we must state that substantial steps have been taken in this direction. A number of valuable scientific projects have been completed, and new precision instruments, designs, automatic control and electronic devices, chemical industry products, plus others have been put into production.

The president of the republic Academy of Sciences discussed in particular the work which has been accomplished in the area of radiophysics, study of active galaxies, projects being carried out at institutes of chemical physics, mathematics, radiophysics, physics, and mechanics. He emphasized that in the area of further strengthening the link between science and production, there has been continuation of work on development and intensification of the activities of special design offices, which are a logical result of the development of basic research at the Academy of Sciences in past years. New equipment has been born here, including laser amplifiers, plotting instruments, short-wave receiving equipment, crystals, and lasers.

Discussing the performance of scientific subdivisions of the Department of Physical-Technical Sciences and Mechanics, V. A. Ambartsumyan stressed that the Central Committee of the Armenian Communist Party, having discussed the activities of this subdivision of the Academy, assigned to the department's scientists important tasks pertaining to solving major problems of applied science.

Highly praising the work being done by the institutes of the Department of Chemical Sciences, the speaker discussed research project results the adoption of which has been of great significance to the national economy. He stated that the work forces of these scientific organizations must conduct research even more extensively in the area of adopting new equipment, of which there is little available at present, into experimental procedures. Noting the work being done in this area at the institutes of organic chemistry and fine organic chemistry, he stated that extensive quest and adoption into the national economy of such research results, as well as efficient co-production with industry are essential. Especially valuable products, high-profitability utilization of non-ore materials, and a shift to organization of low-tonnage branches of the chemical industry are needed.

The level of performance of the institutes of the Department of Earth Sciences has improved significantly. The basic research which has been conducted here has helped make it possible efficiently to utilize scientific research results in the economy. In particular, a fault map has been prepared on the area of the nuclear power plant, which will be used in designing the plant's second unit. V. A. Ambartsumyan noted the productive friendship between scientists of the Armenian Academy of Sciences and Bulgarian Academy of Sciences in the area of earthquake forecasting.

Research conducted by the institutes of the Department of Biological Sciences included investigations of the ontogeny of plants, nature conservation, investigation of the mechanism of activity of the higher nervous system, plus others. One important achievement of biochemists is the founding within our Academy system of the all-union journal NEYROKHIMIYA -- the country's first journal dealing with this newest branch of science.

V. A. Ambartsumyan discussed in detail the activities of the institutes of social sciences. Noting the interesting research conducted by scientific teams in the area of history, oriental studies, archeology and ethnography, economics,

and scientific information, he discussed in particular the tasks which are being performed by economic scientists in the area of planning and forecasting.

At the present stage of economic and social development of society, strengthening of the link between science and production is assuming prime significance. The 26th CPSU Congress assigned scientists the following task: the efforts of "major" science, alongside working on theoretical problems, should be concentrated to a greater degree on solving key economic problems.

Productive relations with the academies of sciences of the union republics and the socialist countries became even stronger during the year of the 60th anniversary of the USSR. In particular, joint research is being conducted with the academies of sciences of Georgia and Belorussia, as well as the Bulgarian People's Republic, the Hungarian People's Republic, and scientific organizations of other countries.

Summarizing the activities of the republic Academy of Sciences, V. A. Ambartsumyan noted the vast assistance which is being rendered by the Central Committee of the Armenian Communist Party and the government of this republic to comprehensive development of science. On behalf of the republic's scientists he gave assurance that the work forces of the scientific establishments of the Academy will direct all their efforts toward accomplishing those tasks formulated by the 26th CPSU Congress pertaining to further strengthening the might of our homeland.

A report on the principal results of the scientific and scientific-organizational activities of the Academy of Sciences of the Armenian SSR in 1981 was presented by ArSSSR Academy of Sciences Academician G. A. Galoyan, academician-secretary of the ArSSR Academy of Sciences.

Noting the successes achieved by the institutes of the departments of the Academy, he stressed that the efforts of all scientific workers had been concentrated on further development of new areas of the basic sciences, on improving the quality and effectiveness of research, and on implementing the decisions of the 26th CPSU Congress and 27th Congress of the Armenian Communist Party in working on scientific problems of pressing importance to the nation's economy. In the year under review the establishments of the republic Academy of Sciences had conducted scientific research work on 533 topics. The annual plan had been successfully fulfilled in the principal indices. Scientific research establishments and other subdivisions of the Academy of Sciences had made a substantial contribution toward further development of the physical-mathematical, technical, chemical, geological, biological and social sciences, having enriched them with new data and conclusions.

The activities of the Academy of Sciences continuously occupy the center of attention of the Central Committee of the Armenian Communist Party and the republic's government. Of great assistance was the decree issued by the Central Committee of the Armenian Communist Party on the work of the Academy's Department of Physical-Technical Sciences and Mechanics and the decree of the republic's Council of Ministers on the activities of the Academy of Sciences Department of Chemical Sciences.

Examining the work of the Department of Physcial-Technical Sciences and Mechanics, and noting the positive activities of its institutes, the Central Committee of the Armenian Communist Party drew the attention of the Presidium of the Academy of Sciences to the fact that the department is not adequately participating in the determination of scientific and technical policy in the branches and sectors of the economy and has no specific programs of promoting technological advance. They have also failed to achieve a businesslike approach to coordination of work activities both with academic scientific research institutes and with higher educational institutions. The Central Committee of the Armenian Communist Party also pointed to a number of other deficiencies and demanded that the Presidium of the Academy of Sciences and the departments increase the effectiveness of basic research and draw up a program to correct the revealed shortcomings.

The Council of Ministers of the Armenian SSR, having discussed the activities of the Academy of Sciences Department of Chemical Sciences in the area of chemistry and chemical engineering, highly praised its performance and the contribution of its institutes toward the development of chemical science and industry in this republic. At the same time it stressed a number of shortcomings in work done to improve the structure of the institute, on development of low-tonnage chemical industry, in solving problems of training cadres and environmental protection, elaboration of principal directions of this republic's economic and social development, preparation for and execution of national and regional programs.

The Academy Presidium, having discussed recent decrees of the Central Committee of the Armenian Communist Party and the republic's Council of Ministers, stressed that these shortcomings apply in equal measure to other departments and institutes. The Presidium adopted measures to correct existing shortcomings.

In his speech at the recent Armenian Communist Party Central Committee plenum, Comrade K. S. Demirchyan, first secretary of the Central Committee, also noted shortcomings and mistakes in the performance of scientific establishments. The plenum demanded that decisive measures be taken to correct them.

These critical comments and the questions raised became a subject of serious analysis by the work forces of the Academy's scientific subdivisions.

Both the General Meeting of the Academy and the annual meeting which were being held on these days in the departments, at which the performance results of the large detachment of scientists were being summarized, the speaker stated in conclusion, have set forth important problems. They are mobilizing the efforts of scientific workers toward unswerving execution of the decisions of the 26th CPSU Congress and the 27th Congress of the Armenian Communist Party.

A discussion of the reports was then held.

"Metsarmangir" certificates were awarded to M. Kh. Chaylakhyan and S. A. Ambartsumyan, academicians of the ArSSR Academy of Sciences, for fruitful scientific activity.

"Vastakagir" certificates for a major contribution to the development of science were awarded to ArSSR Academy of Sciences Academician G. M. Garibyan, ArSSR Academy of Sciences corresponding members L. M. Dzhanpoladyan, V. S. Nalbandyan, and A. M. Gasparyan.

A large group of scientists was awarded the "Govestagir" certificate for successful scientific research activities.

The General Meeting of the Armenian SSR Academy of Sciences was attended by Comrades K. S. Demirchyan, B. Ye. Sarkisov, F. T. Sarkisyan, K. L. Dallakyan, and L. N. Nersesyan, Deputy Chairman of the Presidium of the Supreme Soviet of the Armenian SSR O. M. Bagdasaryan, and Deputy Chairman of the ArSSR Council of Ministers R. Kh. Svetlova.

3024
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ESTONIAN ACADEMICIAN DISCUSSES INTENSIFICATION OF RESEARCH

Tallinn NOORTE HÄÄL in Estonian 26 Jan 82 p 2

[Article by Academician Arno Köörna: "On the Path To Tighter Work--Possibilities of Intensification of the Work of Academic Research Institutions"]

[Text] The characteristic features of USSR economic development in the eighties are profoundly changing, indicating a transition from an essentially extensive development to an intensive one. Shortages and rising costs of productive resources, increasing expenditures for environmental protection, and replenishment of depleted capital assets make it imperative that greater results be obtained from every productive unit. In the last 10 years (1970-1980) the capital assets of the economy increased by 116 percent (in comparative prices), but the gross national product rose only by 67 percent, and national income by 55 percent. At the end of the period there was a 28 percent decline in production per ruble of basic investment compared to the beginning. We cannot go on like this. We would be faced by a decline of the economic growth rate and of the standard of living.

Progress of science and technology must be the first to be harnessed into the service of economic intensification. They hold the key to the primary reserves of increasing the productivity and efficiency of social production. To be sure, science must keep in step with the economy. Moreover, the growth rate of science and technology must exceed that of the national economy, it must lay the precondition for the latter's acceleration. Transition to a path of intensive development must be more rapid in science than in the other branches of the national economy.

The extensive development of science through an increase of workers has come to an end. From 1950-1980 the number of scientific personnel in the USSR grew 8.45 times; in the last five year period this growth rate has slowed.

During the current five year period 5 percent of the workers engaged in science must be dismissed. A smaller staff must now cope with larger tasks. So--transition to intensive development in science has become acute, and the common concern of all scientists is an increase in the effectiveness of science. The most common measure of scientific work is the amount of new knowledge and its basic importance. Applying this to the practical requirements of the national economy, the effectiveness is expressed in a successful

solution to the society's technical-economic and socio-political problems, primarily in the development of new techniques and technology, and an expansion of their areas of applicability.

The integration of science and industry must open ways for a rapid application of the results of science and an expansion of the effectiveness of science from the standpoint of the national economy.

In recent years there has been in science an obvious turn toward topics related to practical needs. This is evidence by the rapid growth of contract work and an increase in the role it plays in financing academic scientific institutions.

The slower the economic growth and the more complicated the problems encountered in practice, the greater the pressure of practical problems on science. This brings out the danger that attention to long-range problems and the needs of basic research can lessen. Attempts to overcome daily problems apart from a long-range development strategy usually gives rise to new and even more complicated problems. For this reason on of the general tasks of increasing the effectiveness of academic research institutions is to preserve a correct balance between basic research and applied science.

In conditions of limited funding and strict labor limits there is a great temptation to increase the contract volume. Every organization tries to grow and expand its area of activity. But this temptation must be resisted so as not to harm the basic work in the fundamental areas of research. The above should not be considered a call for limiting projects dealing with practical matters. To the contrary--they must be done and must ever increase, but in a manner that practical jobs grow out of the basic research conducted in the research agency. And there are reserves for this in the republic's scientific institutions.

An analysis of contracts within the institutes of the Academy indicates that 80 percent of them are related to the basic work of the institutions--not a bad indicator in our opinion.

At the 26th CPSU Congress the role of the USSR Academy of Sciences as the "great science" in the solving of key problems of the national economy was stressed. It is precisely basic research that is the source of strength for applied science. Without new theoretical conclusions and discoveries applied science is merely able to improve existing techniques and technology, without bringing about revolutionary change in the development of productive means. Consequently, a competent choice of topics--taking into account a given agency's potential and perspectives for the future--is a prerequisite for increasing the dividends of scientific work. Practically all academic institutes have reserves for managing their topics and thus tightening up on their research. A sensible scheduling of project completion dates would be another step toward that goal.

In compiling a functional plan it is not enough that each researcher state his wishes. To develop a correct strategy for scientific development and to

realize it through long-term plans there must be good information about each research topic. This must include an overview of the potential possibilities (research director, staff, instrumentation, level of research results compared to international criteria, practical application of the research, intensity of need for practical application, etc.)

Basic research is not only guided by topic selection, it is also important to regulate the speed of progress of one or another project, depending on the results obtained and the nature of tasks to be solved in a given plan period. For an objective analysis a capable team of scientists, economists, sociologists, and science managers is needed. Together with specialists in the area they would compile information about the current state of art in the branch of science, tendencies for development and factors influencing development. The task is not easy, since in science there are ever more long-term research projects that lie on the borderlines of various disciplines or integrate several disciplines. The evaluation of these disciplines is more difficult than of "old" branches of science due to a lack of information and relatively higher risks in the research. Nothing regarding the methods of introspective analysis of highly integrated basic research has been published in the scientific literature at home or abroad. Apparently one must rely only on the judgment of highly qualified experts.

There are other possibilities for increasing the effectiveness of science by internal balancing. One of these is the strengthening of the links between science and production, construction, and test organizations, so as to transform research results into conditions acceptable for production. In the application of some research programs of the academy this question has become quite urgent.

One of the ways to intensify research is to improve program planning. The positive aspects of scientific and scientific-technical programs are obvious. Experiences made in the course of fulfilling 9 all-republic comprehensive long-term programs show that some problems of program planning are only half solved. There are the relating of program goals to the state plans for economic and social development, program support with material-technical resources, program financing, increasing directors' authority, etc. The union-wide regulation of these questions must also be put in order.

From the point of view of a research organization these are basically objective questions. In addition to their solution there is much to be done in intensifying research through better organization and management of the scientific collective.

First off, there must be increased emphasis on the quality of work. Just as in the economy science must also be guided by final results. Final results cannot be judged by the number of written or even published pages, but by their content, by what new and original contribution the scholar has made, what novel technial-technological and other solutions he has developed.

All too often the scientist's evaluation consists only of the number of published works, their scientific impact is mentioned less or not at all. But that should be the decisive factor in a scholar's evaluation.

An emphasis on the final results also means that a scientist's work is evaluated after the completion of a planned task or the substantive exhaustion of a planned topic immediately after completion. One could examine the possibility of making a contract stipulating the time for a planned project's completion and thereafter the contract could be renewed for other planned tasks, depending on the substantive evaluation of the task.

In such a case, of course, the system of financing science must also be changed. In current planning, where the topical plan is separate from the financial plan, questions relating to intensive development, such as research topics or expenses, or moving up of completion deadlines, are especially important. In order that they be moved into a position of importance it is apparently necessary to move from financing agencies to financing discrete subjects and their investigations.

First off, such method should be applied in programmed research. In compiling an institute's topical plan there could be a competition among topics designed to solve certain scientific problems.

Remuneration of scientists should be much more flexible than it is. Currently, in order to grant leading scholars higher salaries they have to be moved to administrative positions. Administrative tasks, however, reduce the production of highly qualified specialists, remove them from research; moreover, not everyone has a wish or the capability for organizational work. The current classification of scholars into junior and senior scientists should be expanded, along with a corresponding differentiation of salaries.

The above would make the internal structure of scientific institutions more mobile, allowing for operative reassignments as the need dictates. There would also be more opportunity to adjust staffs and complement them with young and talented specialists. An unchanged staff becomes older. This has several negative implications for fruitful research.

One factor regarding intensification of work in scholarly agencies concerns discipline. This refers primarily to administrative control over fulfillment of planned tasks. But labor discipline in a creative collective includes not only skillful administration and supervision, it depends on a worker's internal alertness, conscientious attitude toward the tasks, and correct value judgments. Administrative compulsion "at any price," without regard for the collective's quality, the extent of tasks, and the actual possibilities for their fulfillment will have the opposite effect in science. There will merely be organizational surface activity, unnecessary meddling, excess paperwork, meetings and seminars replete with hollow phrases. For example, a constant pressure on scientists can, instead of the hoped-for rapidly achieved practical results, lead to a point that immature theoretical results are presented as finished research, that spheres of application are artifically established, or that the search for practical application is simply abandoned, even though all of this is incompatible with the scholar's creative interest and capabilities. In the opposite case attempts are made to present practical application as theoretical work, the majority of "applied scientists" begins to call themselves theoreticians, etc.

A skilled intensification of science also leads to an increase in the effectiveness of science (the relationship between the effect of science and the expenses made in achieving it).

There are other possibilities besides internal ones to increase the effectiveness of the republic's scholarly potential.

One of these is a mutual approach of the republic's scientific and productive potential. The republic's producing industry has developed relatively independently from local science. Applied science to meet the needs of industry is little developed. The electrotechnical industry has its branch institute in Estonia, other have small construction, projection, and technology organizations where little extensive research is carried out. The industry is mainly oriented toward All-Union central institutes and construction organizations. The academy's research institutes and universities provide as much help to the industry as they can, but usually they do not "pull" productive collectives and enterprises.

Science in the republic actually has features on which production could be based. They consist of various biosynthetic projects, products of microorganic synthesis, microelectronics, as well as instruments based on heterotransfer semiconductors, and various measuring devices. The adaptation of the industry's structure in favor of a research-intensive and highly skilled labor intensive production is quite feasible.

On the other hand there are possibilities of adapting the topics of scholarly institution to the republic's industry.

I would not mention agriculture. The ties of agriculture to agricultural research that is being conducted in branch institutes, many other disciplines within the academy as well as the universities are quite extensive and better organized than science-industry ties.

Reference to adapting the republic's industrial and scientific potential does mean that industry should develop on the basis of the republic's science. This would be nonsense. The republic's industry is, like science, an organic part of the common federal complex and their development must be evaluated in that context. There is merely talk of clarifying the possibilities for integration between science and industry, and to make better use of them in the future.

To increase the effectiveness of science there is need for greater coordination and better direction in unifying the academy's, the universities' and the branch institutes' work toward solving the republic's scientific-technical, social and economic problems. Currently the management of science is dispersed. The scientific institutions and colleges of the republic are subordinated to 18 ministries and agencies. The republic's council on coordination natural and social sciences is not tasked with coordinating technical sciences or directing the research of branch institutes.

Apparently there is a need for firmer central management to solve such problems as:

A coordinated direction of the scientific and industrial potential;

Long-range planning of scientific development (a network of scientific organizations, research projects, etc.)

Compiling of a list of regional scientific-technical comprehensive programs;

Scientific-technical progress policy in the national economy as a whole, as well as its various branches;

Direction of applied science and elimination of difficulties in that activity;

Control over the activity of all the links in the chain of scientific-technical progress in the ministries and productive collectives.

Some of the thoughts presented here are subject to discussion, but we should begin a discussion over the ways to intensify research and, even better--over an energetic approach to improve the effectiveness of science.

On how well we succeed in harnessing all means and methods for improving the effectiveness of science depends the progress in all the aspects of society's life.

9240
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GEORGIAN SCIENCE COMMUNITY NEEDS BETTER ORGANIZATION

Tbilisi ZARYA VOSTOKA in Russian 10 Apr 82 p 2

[Article by T. Gelantiya, assistant lecturer of the Tbilisi State University Department of Political Economy: "The Scientist's Work Day"]

[Text] The Georgian Communist Party Central Committee letter to the communists and all workers of Soviet Georgia in connection with the 10th anniversary of the CPSU Central Committee on the Tbilisskiy Gorkom emphasizes the need for the precise organization of labor at each place of work. This requirement also applies in full to the scientists of all scientific subdivisions. However, many academic and sectorial scientific research institute, design bureau and VUZ department specialists cannot today firmly state that their work day is precisely planned, well organized and, thus, creatively full.

I was once involved in research concerning study of the scientist's performance efficiency. I chatted in this connection with many specialists and inquired after the work day schedule of the leaders of departments and laboratories of certain scientific research institutes and VUZ departments.

The facts testified that the leading specialists manage to spend directly on scientific work no more than one-fifth of their work time on average. Speaking about the unsatisfactory load in the course of the work day, many of them drew attention to how much energy is wasted owing to "trifling matters," which, incidentally, in sum are causing scientific activity palpable harm.

We may begin just with the misapplication of functions. This sickness, incidentally, is typical of almost all scientific research organizations and VUZ departments of the republic. Today scientists are still spending an unjustifiably great deal of time on all kinds of mechanical work connected with the typing, duplication and correcting of every conceivable document. It is seemingly necessary to be at least a candidate of sciences, section leader or department chief in order to make corrections to the typed text of reports and other documents. At the same time there are alongside many laboratory assistants, people with secondary technical education. But more often than not it is simply impossible to entrust to them the compilation of even the

most routine business letter or document. A technician who knows drawing and scientific-technical terminology and has other skills and knowledge was and remains a dream in any institute. All this convinces us of the need to reorganize the training of middle-tier specialists, the need for whom is palpable.

Typists are the real scourge of any institute and VUZ. Both ordinary research assistants and coryphaei hoary with age bow their heads before them with an ingratiating smile. After all, whatever you may say, the typewritten text is an inalienable part of scientific technology. At whatever level work may have been performed, it cannot be considered completed until the results have been printed and duplicated. The scientific research institutes and VUZ's are, for the most part, in acute need of skilled typists. And they can always be counted on the fingers of one hand. Their load can be lightened thanks to the duplication of a large part of the documents with the help of copiers. And it would hardly be advisable to furnish every scientific research institute or VUZ with these, furthermore. This would be superfluous, and it is not everywhere that a rational load for these machines can be achieved. It is evidently more justified to create in the city a special copying office where the orders of scientific research institutes, design bureaus and VUZ departments would be carried out promptly.

There is also a far more serious reason for the irrational use of the scientist's time. It is the insufficient qualifications of part of the scientific personnel. This discussion might seem "trifling" only because formally such are not to be found in the scientific research institutes and VUZ's, as a rule, if we believe here the opinion of the qualification commissions, whose findings testify, for the most part, to the high professional level of all the research assistants. But it is all quite different in practice. Take, for example, a department of the scientific research institute where I carried out my research. The situation here is typical: 12 persons work here. Only the chief has a scientific degree. Half of the assistants, although without a degree, are sufficiently skilled and competent specialists. But it is difficult to rely on the rest, also half. The gap in qualifications leads to the inequitable allocation of work loads. Furthermore, the department leader frequently has to deal with questions which are the responsibility of other of his assistants.

Many scientific research institutes have their own graduate research courses, to which the most promising workers are sent annually. They are sent with a view to their growth in their own scientific establishment. But after completing the graduate research course, many of them endeavor to leave their own scientific research establishment. The turnover of highly skilled personnel is very perceptible. Among the reasons for their leaving the scientists cite material factors, and, in particular, the imprecisely organized system of bonus payments, wage leveling and moral factors concerning opportunities for creative growth and so forth give rise to many complaints.

At the same time many scientific research subdivisions are at times unable to rid themselves of manifest "ballast". And, indeed, how is this to be done if the qualification commissions assess equally highly the work of everyone

without exception. Evidently the time has come for a fundamental change in the approach to an evaluation of the specialists' professional qualities. It is essential for this to revise the attitude toward their certification.

Institutes of an academic profile are not, as is known, confined to the development merely of the theoretical part of problems being studied. Many of them manufacture experimental models and organize their semi-industrial testing on the basis of theoretical conclusions. Consequently, the activity of the majority of institute departments depends on many auxiliary services, including the supply services. Very often work comes to a standstill owing to the lack of a necessary instrument, piece of apparatus, part or metal. And, furthermore, objectively the suppliers always prove to be right: applications for all materials and equipment are compiled ahead of time and without the right of subsequent amendments thereto. But scientific quest is, as a rule, being amended continuously. This is a specific feature and merit of it. So the scientists have to assume in addition to all else the functions of supplier--telephone, inquire, exchange. The "shaking loose" lasts many months, while the experimental models are being manufactured. As a result scientific work suffers....

A few words about the scientific-technical information service of the republic's scientific research establishments. A minimal number of people works here, as a rule, and these are professional translators who do not possess the fundamentals even of engineering. It is, naturally, not easy for them to promptly get their bearings in the stream of incoming information and focus it correctly. However, even if skilled engineers are enlisted, the problem is not solved. What is necessary is a qualitative reorganization and the creation of a special center furnished with a computer, from which any institute might promptly obtain information of interest to it. After all, each kopeck of the scientist's work time saved becomes a ruble of economic results.

The research assistant's work is predominantly creative, and this means that, like any creative work, is subordinated to a fluctuating system of returns. Sociologists have determined that in the course of a work day the scientist's effective work is the equivalent of 4 hours. But this is on average. A number of examples convinces us that in certain cases it is far less. The reason is the low organization of labor.

How, then, should a research assistant construct the work-time schedule such as to ensure that his activity produce the maximum returns? Providing some general recommendations in this case is evidently no easy matter. One thing is clear: the appropriate specialists should involve themselves with the development of this difficult question, and the closest attention to it should be paid by scientific research institute and department leaders, for whom even now it would be good sense to turn to the experience accumulated in this field by the Dnepropetrovsk people--the "Dneprogiproshakht" Institute--where the so-called free work schedule has been introduced in practice. What is this? It is a person's right to himself plan the start and finish of the work day and the time of the meal break, but with the obligatory completion of all the hours stipulated by law. For example, from 7 until 10 in the morning work may be started at any time. When it is finished is each

person's own business. From 10 through 12 and from 2 until 4 in the afternoon everyone has to be in his place. This is "contact time". Hours used for personal needs have to be worked off without fail. The free schedule has fully justified itself. How does this show up in practice? In the entrance to the institute there is an automatic passageway. Instead of a coin, an admission tag on which the employee's personal number is encoded is inserted in the slot. The instrument reads it and transmits it to computer storage. The computer issues a report for all departments. This includes the person's schedule number and name, the start and finish of the work day and the number of hours he has worked.

The accounting system puts all nonservice matters outside of work time. These include the cigarette break even. A highly rational, economical approach to the research assistant's every working minute can be seen here. The point being that smoking is prohibited in the institute's work premises. There is a special room for those who wish to smoke. If you wish to smoke, you just step out, but the machine accurately computes the time of the cigarette breaks and deducts it from the total of hours worked. The free schedule is having a perceptible effect in strengthen in labor discipline.

The problems of the "trifling matters" which are encountered in any scientific research establishment and in the VUZ must, finally, be tackled--after all, "trifling matters," if one goes into it, are quite a sizable reserve of an increase in the creative returns of highly skilled specialists, such as are scientists. The Georgian Communist Party Central Committee letter to the communists and all working people of Soviet Georgia in connection with the 10th anniversary of the CPSU Central Committee decree on the Tbilisskiy Gorkom is geared to its rational use.

8850
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GEORGIAN ACADEMICIAN DISCUSSES REPUBLIC'S SCIENTIFIC ACHIEVEMENTS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 May 82 p 4

[Article by Ye. Kharadze, president of the Georgian SSR Academy of Sciences and corresponding member of the USSR Academy of Sciences: "Scale of Influence"]

[Text] It is possible to graphically judge the level of development of our science both by the scale of influence on scientific-technical progress in the republic itself and also throughout the country. The achievements of Georgian science have contributed to a large extent to the formation of the republic's present-day industrial appearance and the inception and development of such leading sectors as engineering, electrical equipment, instrument making, chemistry and metallurgy. The prestige of our scientists is also high in the all-union arena.

Thus, for example, they are today participating in 20 most important goal-oriented comprehensive programs approved for the 5-year plan by the USSR State Committee for Science and Technology in conjunction with the USSR Academy of Sciences and the USSR Gosplan. And with respect to such problems as solid state radiation physics, study of the structure and dynamics of the Galaxy, natural zeolites and the use of explosive energy in the economy our collectives perform the role of head or coordinating centers.

The Georgian Academy of Sciences' Institute of Physics--the head organization with respect to the problem of low-temperature radiation materiology--is among the country's leading scientitic establishments. It is simultaneously well known for its in-depth research in the sphere of low-temperature, solid state, high-energy and cosmic ray physics, semiconductors and plasma physics. The Georgian mathematicians' school is known far beyond not only the republic but the country also. Its main achievements are in the field of the mathematical theory of elasticity and the theory of singular integral equations.

Today's tactics of the development of Georgian science amount to organically combining fundamental research with applied research and the activity of institutes and design bureaus with the current and long-term tasks of the national economy. The fruitfulness of such an approach has been corroborated in practice. Thus, for example, in conjunction with their colleagues from the Institute of Inorganic Chemistry and Electrochemistry and specialists of the Madneul'skiy Mining-Concentrating Works assistants of the republic Academy of Sciences' Institute of Physics and Organic Chemistry have created the

original technology of the comprehensive processing of copper concentrate and low-grade manganese ores.

"A decisive and most acute area today is the introduction of scientific discoveries and inventions," Comrade L.I. Brezhnev emphasized from the platform of the 26th party congress. En route to the solution of this problem we are not only seeking new forms of the interaction of science and practice but also endeavoring to make full use of what is already known. In particular, it is a question of the economic contract system supplemented by contracts on creative collaboration. It was this instrument of the integration of efforts which helped the scientists of the republic Academy of Sciences' Institute of Metallurgy create and introduce at the Zestafoni Ferroalloys Plant the new technology of the agglomeration of carbonate manganese ores, the savings from which has amounted to R2 million.

An appreciable role in realization of the scientists' development is also performed by the so-called science-production divisions being organized currently at the republic's leading enterprises. For example, such divisions created by the Georgian Polytechnical Institute imeni V.I. Lenin Technology Department at the Tbilisi Instrument Plant and Rustavi Foundry are manufacturing a production tooling instrument and parts from new nontungsten alloys developed by the scientists. It is planned to create such divisions at a number of other Tbilisi enterprises also.

The creative relations of Georgian scientists, specialists and production innovators with their colleagues from other union republics are not restricted to participation in all-union scientific-technical programs. Accordingly, many tasks of Georgia's economic and social development also are being tackled with the support of the whole country. The food program, in whose realization our republic's workers have a considerable role, is currently a principal point of application of common efforts. There is no doubt that this program will be further testimony to the indisputable advantages of the union of equal Soviet republics and the constant concern of our party and government for the growth of Soviet people's well-being.

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CSO: 1814/81

ALIYEV MEETS WITH ACADEMY OF SCIENCES CONFEREES

Baku BAKINSKIY RABOCHIY in Russian 15 May 82 p 1

[Azerinform article: "Reception at the Central Committee of the Communist Party of Azerbaijan"]

[Text] Candidate member of the Politburo of the CPSU Central Committee, First Secretary of the Central Committee of the Communist Party of Azerbaijan G.A. Aliyev received the participants of the conference held in Baku and organized by the Council for Coordination of the Activities of the Academies of Sciences of the Union Republics attached to the presidium of the USSR Academy of Sciences.

Vice President of the USSR Academy of Sciences Academician V.A. Kotel'nikov, expressing sincere gratitude for the cordiality and hospitality accorded on Azerbaijan soil, went on to provide information on the actual problems on the conference's agenda and its results. He dwelt on the basic directions of elaboration of the long-term complex program of scientific-technical progress of the country, emphasizing the great importance in this work of coordination of the resources of contiguous union republics, particularly in the Transcaucasus region.

In sharing his impressions of his visit in Azerbaijan, Comrade Kotel'nikov especially noted the achievements of the republic's scientists attained in recent years. They became possible largely because of the major attention and concern of the Central Committee of the Communist Party of Azerbaijan for the development of science, its personnel and greater effectiveness of the researches conducted by them.

Warmly greeting the guests, Comrade G.A. Aliyev expressed satisfaction that the conference organized by the USSR Academy of Sciences in which prominent Soviet scientists and specialists participated had been held in Baku. In recent years, he said, the capital of Azerbaijan has become a place for the holding of many impressive all-union and international forums of scientists at which ways of further developing different branches of contemporary science have been discussed.

The Communist Party and the Soviet government and Comrade L.I. Brezhnev pay tremendous attention to strengthening of the economic and defensive might of

our socialist Motherland. An important role in this belongs to the prominent figures of Soviet science occupying forward positions in the struggle for the building of a material and technical base for communism. Fulfilling the decisions of the 26th CPSU Congress and the directives of Comrade L.I. Brezhnev, they are called to henceforward undeviatingly raise the effectiveness of their work both in theoretical and applied fields and to speed up in every possible way the introduction of the achievements of science into the national economy.

Referring to the fact that the present stage of communist construction demands with all insistence continued acceleration of scientific-technical progress, Comrade Aliyev pointed out the big contribution made by scientists to the development of the complex program of its development and the important value of coordinating the work of the republic academies of sciences. He wished the participants of the conference creative successes in work and to worthily mark the big and joyous holiday of the Soviet people--the 60th anniversary of the formation of the USSR.

There took part in the talk Secretary of the Central Committee of the Communist Party of Azerbaijan G.A. Gasanov, corresponding members of the USSR Academy of Sciences, presidents of the academies of sciences of: Georgian SSR--Ye.K. Kharadze, Azerbaijan SSR--G.B. Abdullayev, Latvian SSR--A.K. Malmeyster, Estonian SSR--K.K. Rebane and vice presidents of the academies of sciences of: Uzbek SSR--S.Kh. Sirazhdinov, Lithuanian SSR--Yu.K. Pozhela, Armenian SSR--A.G. Iosif'yan, Turkmen SSR--O.G. Ovezgel'dyyev and acting vice president of the Azerbaijan SSR Academy of Sciences N.A. Guliyev.

7697
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SCIENTIFIC CENTER CREATED IN TASHKENT

Tashkent PRAVDA VOSTOKA in Russian 23 May 82 p 1

[Article by A. Tankhel'son: "The Tashkent Scientific Center" under the rubric "Fact and Comments"]

> [Text] Upon the decision of the Tashkentskaya Oblast Party Committee, the Tashkent Scientific Center of the republic's Academy of Sciences has been set up as a public organization. Its newly appointed chairman is Corresponding Member of the Uzbek SSR Academy of Sciences, Director of the Institute of the Mechanics and Seismic Resistance of Structures, T. D. Dzhurayev.

The closest integration of science with production is an insistent behest of the times. Hence the idea of establishing such a center precisely in Tashkent has long been ripe. The more so considering that Tashkent and Tashkentskaya Oblast lead the republic in the concentration of scientific resources. The dozens of scientific institutions and higher schools in which work hundreds of doctors and thousands of candidates of sciences represent a major resource called upon to play a leading role in espediting the rate of scientific and technical progress in every field of the national economy and increasing the effectiveness of scientific research.

The Tashkent Scientific Center will be a kind of headquarters receiving all "orders" for scientific support of various production tasks. It will be at the same time a coordinator of the entire progress from the idea to its fruition and a monitor of the efficient interaction of science and production in every individual case. In other words, the Center has been established with the object of solving rapidly and most effectively the problems of regional management of scientific and technical progress and coordinating scientific research so as to preclude duplication and tardy progress.

The Center's broad programs of activity will be named briefly. They are six. The first program, "Tashkent Cotton" ("Industrial Technology of the Growing and Processing of Cotton") has already been drafted. The five others--"The Food Program," "Tashkent Metal," "The Tashkent Construction Industry," "Secondary and Local Resources," and "Environmental Protection")--should be developed this year.

The oblast party committee has approved the statute of the Tashkent Scientific Center. Its council will consist of leading scientists of the republic, directors and managers of the principal enterprises and farms, and workers of party and Soviet agencies. To ensure the most effective participation of scientific institutions in the development of targeted comprehensive programs, a mutual agreement betwen the Uzbek SSR Academy of Sciences and the enterprises, organizations, and farms of the city and oblast has also been approved.

A tight meshing and coordination of the plans of scientific research organizations, enterprises, and farms as well as an all-out acceleration of the introduction of research results in the lights of the decisions of the 26th CPSU Congress and the directives voiced by Leonid Il'ich Brezhnev while conferring the Order of Lenin on this republic--such are the immediate goals and tasks of the Tashkent Scientific Center, which already is taking its first steps.

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CSO: 1830/373

SOCIALIST COUNTRIES HOLD CONFERENCE ON MACHINERY IN FRUNZE

Frunze SOVETSKAYA KIRGIZIYA in Russian 29 May 82 p 3

[L. Zholmukhamedova roundup: "In Close Cooperation"]

[Text] A meeting of the "Scientific Principles of Machinery, Structure and Technological Process Mechanics" Problem-Solving Commission of multilateral scientific cooperation of the socialist countries' academies of sciences was held from 25 through 28 May in Frunze. Prominent scientists from Bulgaria, Hungary, Vietnam, the GDR, Poland, the USSR and Czechoslovakia participated in the meeting.

Approximately 100 scientific papers and reports were received in plenary and sectional sessions. The scientists summed up the activity of the socialist countries' academies of sciences with respect to the further development of the scientific principles of machinery, structure and technological process mechanics, discussed urgent problems of mechanics and outlined a work plan for the years to come and ways to intensify mutual cooperation.

The participants in the meeting familiarized themselves with the activity of institutes of the Kirghiz SSR Academy of Sciences.

K.N. Kulmatov, A. Dzhumagulov and N.P. Lomov, members of the Kirghiz Communist Party Central Committee Bureau, Dzh. Ch. Tashibekova, candidate of the Kirghiz Communist Party Central Committee Bureau, and A.K. Karypkulov, chief of the Kirghiz Communist Party Central Committee Science and Educational Institutions Department, participated in the meeting.

A number of participants in the meeting chatted with the SOVETSKAYA KIRGIZIYA correspondent.

A. Yu. Ishlinskiy, chairman of the problem-solving commission, member of the USSR Academy of Sciences and chairman of the USSR All-Union Council of Scientific-Technical Societies:

The need for joint research in the sphere of machinery and technological process mechanics arose here long ago. And since the end of the 1960's we have regularly been exchanging opinions on the priority tasks and problems whose solution would be useful for the development of the economies of the socialist community countries. Agreements have been concluded on problems of mechanics, and the scientists of different countries have begun to meet at scientific conferences more frequently. Such meetings are now held regularly--every 2 years--and it is a question of meetings of a specially created problem-solving commission of multilateral scientific cooperation. The first such meeting was held in Czechoslovakia, near Prague. This meeting--the second--is bigger.

The choice of Frunze was not accidental. Serious mechanical and mining equipment sections are being developed in Frunze. It is here that working models of highly productive mining machinery have been created, the theory of dynamic impact on rock was developed and effective methods of drilling not only under normal but also extreme conditions have been developed.

D.M. Klimov, corresponding member of the USSR Academy of Sciences:

The cooperation of the institutes of mechanics of the socialist countries is an interesting and useful form of scientific work. At this meeting we have discussed work plans and the results of scientific research in a number of spheres of mechanics aimed at the solution of urgent technology problems. A number of interesting papers, including those of Kirghiz scientists, was delivered.

M.F. Dimentberg, doctor of technical sciences and senior research assistant of the USSR Academy of Sciences' Institute of the Problems of Mechanics:

I am working on problems of the vibration of atomic power installations.

During the conference we heard a number of interesting reports in this sphere of mechanics, including the colleague from Bulgaria.

Prof R.F. Ganiyev, chief of a department of the USSR Academy of Sciences' Institute of Machinery Science:

International multilateral cooperation has been developed particularly recently. And the benefits from this are extraordinary.

Our department is engaged in the development of the theory of nonlinear vibrations of multiphase systems. And we are studying the vibrations, furthermore, not only from the standpoints of danger to the machinery but also from those of the use of vibration processes in technology. This will make it possible to intensify technological processes appreciably and, consequently, produce big savings. In ore concentration in metallurgy, for example. It will be possible to increase the fuel-energy balance, having obtained new types of fuel: gasoline-water, fuel oil-water, fuel oil-coal dust-water.... This research is of interest to the food industry. Or land reclamation, for example.

Rivner Fazylovich, this has been an arid year here, and the "Fregaty" sprinklers malfunction quite often. Is work being performed in this field in your department?

The "Fregaty" malfunction owing to heavy vibration. We have developed stabilizers which make it possible to reliably control the waves and bear the vibration load. The stabilizers also make it possible to discard the metal content of the pipelines at great heights, for example.

Prof I.V. Shirko of the Moscow Physico-Technical Institute:

I would add to what Ganiyev has said that man has long been studying the theory of the vibration of mechanical systems. There was nothing new to be discovered in this science, seemingly. But here, if you please, Ganiyev has derived benefits from vibration. He has broadened our understanding of the phenomena of vibrations. He views vibration theory as a theory of periodical movements in the broad sense of this word. Such an approach is very effective and has led to interesting results in the most unexpected spheres of equipment and technology. This is a new school.

O.M. Belotserkovskiy, member of the USSR Academy of Sciences:

International cooperation has recently grown from narrow, personal contacts into multilateral, well-organized cooperation.

This is attested by the present meeting, the distinguishing feature of which is a broad scientific session devoted to urgent problems of mechanics. I believe that profound and topical themes were formulated at the meeting. I would like to mention a whole group of developments, such as, for example, the Bulgarian complex of operations connected with the creation of modern computers, Polish operations with respect to machinery dynamics and Czechoslovak operations connected with turbulence theory.

The meeting demonstrated the unity of the scientists and their endeavor to develop scientific-technical potential contributing to the strengthening of friendship and peace.

Prof Zapryan Dimitrov Zapryanov of the People's Republic of Bulgaria:

This is my first visit to Kirghizia.... We have been quite moved by the hospitality. The meeting was very well organized. We have heard a number of interesting papers and familiarized ourselves more closely with many problems. I would like to mention the achievements of the KiSSR Academy of Sciences' Institute of Physics and Mathematics.

Prof Nguyen Van Dao of the Socialist Republic of Vietnam:

The standard of work of the republic Academy of Sciences made a big impression on me. I knew that Kirghiz scientists were working on the most complex problems and working successfully at that. But what I have seen and heard corresponds to the highest requirements. This is big, real and complex science.

The delegation from the GDR: Manfed Hofmeister, leader, Assistant Prof Albert Duda, Prof Udo Fischer, Hans Geltner, corresponding member of the GDR Academy of Sciences, and others:

In the course of the meeting we made the close acquaintance of the mechanicians of the republic Academy of Sciences. A very good impression was made, particularly by the high standard of the solution of mechanical and mine engineering problems. The most important thing here is the close collaboration of theory and practice. The meeting suggested interesting ideas to us. We believe that multilateral work helps strengthen relations between our academies.

Kirghiz nature is unique. The city of Frunze is very green, and Issyk-Kul' is beautiful. Clear water, mountains, air.... We can congratulate you on such an efficient, solicitous attitude toward nature.

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LATVIAN ACADEMY OF SCIENCES ELECTS NEW MEMBERS

Riga SOVETSKAYA LATVIYA in Russian 18 Jun 82 p 4

[LATINFORM report: "Elections to the Academy of Sciences"]

[Text] On 17 June a general meeting of the academy took place in the conference of the high building of the Latvian Academy of Sciences. It was devoted to the election of full members (academicians) and corresponding members to the republic Academy of Sciences for the vacancies announced.

The following were elected as full members (academicians) of the Latvian SSR Academy of Sciences: for the specialty "Peptide Chemistry," director of the LaSSR Academy of Sciences Institute of Organic Synthesis, doctor of chemical sciences, professor G.I. Chipens; for the specialty "Analytical Chemistry," chief of the republic Academy of Sciences Institute of Inorganic Compounds laboratory of internal complex compounds, doctor of chemical sciences, professor Yu.A. Bankovskiy; for the specialty "Technical Microbiology," acting director of the LaSSR Academy of Sciences Institute of Microbiology imeni Avgust Kirkhenshteyn experimental plant for biochemical preparations, doctor of chemical sciences, professor R.Ya. Karklin'; for the specialty "Literary Criticism," dircetor of the republic Academy of Sciences Institute of Language and Literature imeni Andrey Upit, candidate of philological sciences Ya.Ya. Kalnin'.

The following were elected as corresponding members of the LaSSR Academy of Sciences: for the specialty "The Chemistry of Elementary Organic Compounds," deputy director for scientific work at the republic Academy of Sciences Institute of Organic Synthesis, doctor of chemical sciences, professor E.Ya. Lukevits; for the specialty "Wood Chemistry," deputy director for scientific work at the LaSSR Academy of Sciences Institute of Wood Chemistry, doctor of technical sciences, professor V.S. Gromov, and director of the LaSSR Academy of Sciences Institute of Wood Chemistry, doctor of technical sciences, professor V.P. Karlivan; for the specialty "Molecular Biology," chief of the nucleic acid laboratory at the republic Academy of Sciences Institute of Organic Synthesis, doctor of chemical sciences, professor E.Ya. Gren; for the specialty "Biotechnology," chief of the department of bioengineering at the LaSSR Academy of Sciences Institute of Microbiology imeni Avgust Kirkhenshteyn, doctor of technical sciences U.E. Viyestur; for the specialty "Mechanics of Failure and Fatigue of Materials," deputy director for scientific work at the republic Academy of Sciences Institute of Polymer Mechanics, doctor of physicomathematical sciences, professor V.P. Tamuzh; for the specialty "Economics

of Agriculture," LaSSR minister of agriculture, doctor of agricultural sciences, professor K.A. Shpogis, and rector of the Latvian Agricultural Academy, doctor of economic sciences, professor V.G. Timofeyev; for the specialty "Solid State Physics," director of the Scientific Research Institute of Solid State Physics at the Latvian State University imeni P. Stuchki, doctor of physicomathemtaical sciences, professor Yu.R. Zakis.

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LATVIANS HOLD PRESS CONFERENCE TO PROPAGANDIZE S&T

Riga SOVETSKAYA LATVIYA in Russian 30 Mar 82 p 1

[LATINFORM report: "A Press Conference in the Latvian Communist Party Central Committee"]

[Text] A press conference was held in the Latvian Communist Party Central Committee on 29 March for workers in republic, rayon, city and combined newspapers, journals, and television and radio broadcasting, LATINFORM and publishing. The main directions in the activity of the means of mass information and propaganda in solving topical questions of the approximation of science and production were discussed.

The press conference was conducted by V.S. Klibik, chief of the Latvian Communist Party Central Committee Science and Education Institutions Department.

President of the LaSSR Academy of Sciences, Hero of Socialist Labor A.K. Malmeyster and LaSSR Academy of Sciences academicians M.Ye. Beker and A.F. Krogeris and corresponding member of the LaSSR Academy of Sciences G.I. Chipens, addressed the journalists.

It was noted at the press conference that science plays a crucial role in improving the efficiency of the economics and intensification of all social production. Combining profundity in their scientific research with the achievement of concrete applied results, the scientists of the republic are concentrating their work efforts on problems having great significance for the national economy, public health and culture. Here extensive use is made of the method of goal-oriented programs, each of which is a substantiated and accurately checked plan for measures aimed at the complete resolution of a given task. This kind of comprehensive approach to the study of problems is being increasingly confirmed as an essential condition for correctly organized scientific endeavor. The interaction of scientific effort meets the requirements of the present stage in the development of science and the demands of the 26th CPSU Congress.

Thus, research conducted by seven academy institutes are linked with the implementation of the food program. A particularly weighty contribution is being made by the Institute of Microbiology imeni A. Kirkhenshteyn, whose achievements are promoting a further upsurge in a most important sector of agriculture, namely livestock farming, and strengthening its fodder base. At the press conference journalists familiarized themselves with the new discoveries in molecular biology and the way valuable scientific ideas are being used in practical applications.

Scientists have also had considerable successes in the development of the republic's fuel and energy system. At the Institute of Engineering Physics mathematical models have been created that make it possible with the aid of computers to calculate optimal parameters for any complex power grid. Work is continuing on development of the principles used for heat supplies in cities and the countryside. Many of the proposals from the staff of the institute have been recognized not only in Latvia but throughout the country.

Profound theoretical studies in the field of developing effective drugs and means of chemicalization for agriculture are being conducted at the Institute of Organic Synthesis. One rapidly developing avenue is the development of drugs based on natural biological regulators, namely hormones, enzymes and prostoglandins. A sector of industry new for the country has been organized--the production of peptide compounds--and is evoking great interest among foreign firms. The work of the collective has deservedly been recognized with the award of a USSR State Prize.

At the presss conference leading scientists in the republic dealt in detail with key questions in the development of research and the faster introduction of the results of discoveries, and they talked about the tasks set for science during the current five-year plan and for the longer term.

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CSO: 1814/105

MOLDAVIA WORKING ON 15 COMPREHENSIVE S&T PROGRAMS

Kishinev SOVETSKAYA MOLDAVIYA in Russian 17 Apr 82 p 2

[Article by I. Shkorupeyev, candidate of economics and deputy chairman of the republic Scientific-Technical Societies Council: "What the Scientific-Technical Society Can Do"]

> [Text] Some 170 comprehensive scientific-technical programs are being implemented countrywide, 15 of them in the republic. Large-scale scientific forces have been enlisted in their fulfillment in the present 5-year plan.

The enlistment in work on the programs of such a significant number of coexecutants who are at times not connected either territorially or structurally is giving rise to certain difficulties. Perhaps the main one is comminution and the absence of a single center endowed with administrative powers. The councils which have been created in respect of each program perform the functions of coordinator and, partially, of control, but this "purely" scientific body is in practice not in a position to tackle all questions of interaction to the full extent.

Consequently, what is needed is an instrument by means of which it is possible to unite the efforts of the coexecutants, increase mutual responsibility and struggle for strict plan orientation in the implementation of each stage of the program. All-union socialist competition for the successful fulfillment of the comprehensive scientific-technical programs is now becoming just such an effective instrument.

The Moldavian Republic Council of Trade Unions, Academy of Sciences, republic Council for the Coordination of Scientific-Technical Problems and the republic Scientific-Technical Societies Council recently examined and approved the terms of such competition in the repbulic. Its main goals were determined thus: the timely fulfillment of all stages of the development of a program, a high scientific-technical level, the surmounting of interdepartmental barriers and a refinement of the interaction and mutual assistance of the coexecutant-collectives.

The scientific-technical societies are assigned a big role in the organization of competition. Having joined in socialist competition, Moldavia's scientific-technical societies are participating actively in the development

and fulfillment of comprehensive programs at all levels: all-union, sectorial and regional and at enterprise and association level. For the scientific-technical society organizations this has determined a qualitatively new direction in work, and its purpose is to assist the successful fulfillment of the comprehensive programs. The field of activity is truly wide here. More than 40 of Moldavia's enterprises, associations, institutes and educational institutions are executants and coexecutants with respect to the fulfillment of 32 all-union programs.

More than 100 scientific establishments of the Moldavian SSR Academy of Sciences, sectorial scientific research institutes, science-production associations and enterprises are participating in republic comprehensive programs. It is not difficult to imagine how important it is under these conditions to improve the control of the programs, exercise operational supervision of their development and introduction, ensure an increase in the efficiency of scientific research and accelerate the introduction of the results that have been achieved in production.

Considering the importance of these measures, the Scientific-Technical Societies Republic Council and sectorial boards have organized sponsorship and put under special public supervision 16 goal-oriented all-union programs and 3 sectorial and 10 republic intersectorial scientific-technical programs. Public coordinating groups headed by scientists and specialists which have developed their own long-term plans for promoting fulfillment of the programs in the 11th Five-Year Plan have been created in respect of each of them.

Socialist competition is thus becoming a powerful lever of an increase in the creative assertiveness of all those working in the sphere of science and production.

Competition among science workers is assuming a more extensive scale, its organization is being perfected and the practice of the summation of results is being improved. It is assuming the most diverse forms: collective and personal pledges, reviews, competitions and the joint pledges of production collectives and sectorial scientific research institutes working on a single problem.

The Moldavian Council of Trade Unions, MSSR Academy of Sciences and the republic Coordinating Council have approved an initiative of the scientific-technical societies concerning the utmost development of the republic socialist competition of scientific and production collectives for the successful fulfillment of intersectorial scientific-technical programs and have instituted a challenge red banner and cash prizes. The competition results will be summed up annually by the republic Coordinating Council.

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CSO: 1814/98

SIBERIAN BRANCH OF ACADEMY OF SCIENCES RECEIVES ORDER OF LENIN

Moscow IZVESTIYA in Russian 6 Jun 82 p 3

[TASS report: "In the Vanguard of the Scientific Quest. The Presentation of an Order of Lenin to the Siberian Branch of the USSR Academy of Sciences"]

[Text] Novosibirsk, 5 June--The bold state experiment in forming a powerful scientific potential in the east of the country, initiated a quarter of a century ago, has become a shining example of the enormous possibilities of our society for large-scale tasks. The Siberian Branch of the USSR Academy of Sciences has been awarded an Order of Lenin for its successes in conducting scientific research, training highly qualified scientific personnel and making a large contribution to the development of production forces in Siberia.

A ceremonial meeting devoted to the presentation of the high award took place today in the House of Scientists in Akademgorodok.

Those present enthusiastically elected an honorary presidium made up of the CPSU Central Committee Politburo led by comrade L.I. Brezhnev.

CPSU Central Committee Politburo candidate member and chairman of the RSFSR Council of Ministers M.S. Solomentsev, who was warmly greeted by those present, delivered a speech.

To the accompaniment of prolonged applause he conveyed to those participating at the ceremonial meeting and to the scientists, scientific and technical workers and postgraduate students and the entire collective of the branch warm congratulations on the high award of the motherland and wishes for new creative accomplishments, on behalf of the CPSU Central Committee Politburo and of comrade L.I. Brezhnev.

Noting the great achievements of the scientists of the Siberian Branch, Leonid Ilich stressed that these successes are the result of bold scientific research and discoveries and selfless labor. He expressed the conviction that the contribution made by the scientists of Siberia in developing Soviet science and resolving the tasks set by the 26th CPSU Congress will also henceforth constantly grow.

Having drawn special attention to the importance of participation by the scientific establishments of Siberia in the implementation of the USSR Food Program, comrade L.I. Brezhnev wished the Siberian scientists success and fruitful work in this national matter.

In accordance with the instructions of Vladimir Ilich Lenin, the CPSU and the Soviet government, since the first days of the creation of our state, M.S. Solometsev said, have given unremitting attention to the development of the eastern regions of the country. This basic strategic party line was underpinned also by the 26th CPSU Congress.

The foresight of the genial Russian scientist Mikhail Vasil'yevich Lomonosov that Russian might would take root in Siberia has now been concretely and visibly confirmed. Three-fourths of the surveyed reserves of coal, oil and gas and more than half of the potential hydropower resources and reserves of industrial timber and a large amount of nonferrous and valuable metals, diamonds and arable land have been accrued in Siberia through the will of the party and the labor of the workers, peasants and intelligentsia to add to the riches of the land of the soviets.

The party values highly the outstanding role that is being played by Soviet science in developing the production forces of the country and its eastern regions. Now, a quarter of a century after the organization of the Siberian Branch of the USSR Academy of Sciences--this major scientific center of the country--the wisdom and farsightedness of the party and Soviet government in significantly strengthening Siberia's scientific and technical potential, the effectiveness of the help given to the new endeavor by party and state organs, and the enormous attention to the scientific center in Siberia given also by the USSR Academy of Sciences, can be clearly seen.

The years that have elapsed have convincingly shown the fiery patriotism, scientific mobility and enthusiams shown by Soviet scientists who decided at the call of the party and the imperative of their civic duty to devote themselves to a wonderful cause--the cause of developing science in Siberia.

Having dwelled on the scientific developments of the collective of the branch, the speaker noted that the Siberians have confirmed with concrete deeds the profound thought voiced by Leonid Ilich Brezhnev that nothing is more practical than good theory.

Along with the great successes of the scientists of the Siberian Branch, they also face some problems that must be resolved. Precise landmarks for the organization of work by all of Soviet science, including the Siberian Branch, have been defined by the decisions of the 26th CPSU Congress and CPSU Central Committee plenums and revealed in the works and speeches of Leonid Ilich Brezhnev.

Spheres of the most fixed attention by the Siberian Branch of the USSR Academy of Sciences have been reflected in CPSU Central Committee decrees and Soviet government decisions defining long-range and current tasks for Siberian scientists, in close coordination with the problems of developing the region as a most important integral part of the country's unified national economic complex.

In the future too it is necessary to insure the preferential development of fundamental research, which helps in the formation and significant growth of our society's scientific potential, serves as a source of fundamentally new technical and technological decisions and leads to the radical transformation of production forces.

One key problem in the development of our country's economy, and this is stressed in party decisions, is the acceleration of scientific and technical progress, The achievements of Soviet science on this plane are great. During the past 10 years they have made it possible to virtually double the volume of material production.

And the Siberian scientists have promoted scientific and technical progess in no small way. It must be recognized, however, that research results and even discoveries and inventions do not always get their travelling orders into production quickly enough.

The 26th CPSU Congress set forth with all definiteness the demand to bring scientific research and planning and design work closer to production, and to do this in an economic and organized way. The integration of science with production, it states in the CPSU Central Committee accountability report, is an urgent demand of the present epoch.

To the honor of the scientists of the Siberian Branch it must be said that they are taking energetic steps aimed at preventing the union of science and production from becoming an insurmountable barrier. Here, great importance attaches to "going out into the sector." It is essential in the future also to seek out new forms for cooperation between scientific establishments and enterprises and organizations and to reduce lead times for the introduction into production of completed scientific research work. Life insistently demands a closer link between the Siberian scientists and the union and republic ministries and administrations.

One important feature at the present stage of the country's development is the shift to the east and the north in the disposition of production forces. As you know, there are many reasons for this, and one of them is the great natural opportunites whose exploitation is being promoted by the successful quest of the Siberian scientists. A very great deal more must be done to make the contribution of the eastern regions to the development of the country's national economy correspond in full measure with the great possibilities.

The extraction sectors are being developed at the highest rates. Siberia has taken upon itself the entire growth in the recovery of oil and gas within the country. This circumstance enhances the responsibility placed on those who through their scientific research, quests and developments are called upon to insure the discovery of new mineral reserves and their more complete utilization.

The movement of production forces to the east also poses the important task of developing a number of sectors in the processing industry and the production of machinery and equipment adapted for the specific conditions of the regions in which they are used. There is a need to develop the kinds of materials and technological processes and machines that would make it possible to achieve the highest labor productivity and a considerable saving of labor resources. Energy-conservation and waste-free technologies are also acquiring special significance.

Speaking about solving questions of the rational disposition of production forces in the Siberian and Far East regions, the speaker noted that what is important here is not only that advanced ideas be incorporated in initial calculations but also what costs are entailed in order to accomplish these ideas in practice. It

is essential that new projects exclude shortcomings revealed previously, so that they help to make the labor of the Siberians as productive as possible and everyday life fully in accord with today's requirements.

The accelerated development of Siberia's production forces is placing additional emphasis on yet another problem that in essence has its own national significance. This is every possible upswing in agriculture and insuring deliveries of foodstuffs to the population and raw materials to industry.

The scientific collectives of the Siberian Branch of the USSR Academy of Sciences and the Siberian Branch of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin are doing a great deal to enhance the efficiency of the agrarian sectors and improve supplies for the population through local production. The decisions of the CPSU Central Committee May Plenum and the Food Program developed and adopted on the initiative of Leonid Ilich Brezhnev set major new tasks for science in the development of agriculture.

As the CPSU Central Committee May Plenum decisions stress, one very important condition for the successful realization of the USSR Food Program is the acceleration of scientific and technical progress in agriculture and in all the sectors of the agrarian-industrial complex, together with the strengthening of its material-technical base.

Naturally, here the role of scientific research, both basic and applied, is growing immeasurably. Scientists, including those in Siberia, must activate work in the selection of new varieties and hybrids of agricultural crops, develop and introduce industrial technology, prepare scientifically sound recommendations for the further improvement of specialization, concentration and interfarm cooperation in production, and introduce progressive forms of labor organization.

Special attention is given in the decisions of the CPSU Central Committee May Plenum to the need to develop theoretical research on the problems of genetic engineering in plant, microorganism and animal selection work, biological technologies for synthesizing protein and biologically active substances, and the development of plant protection agents and growth regulators.

The task is also set of conducting major scientific developments at the interface with the sectors of the agrarian-industrial complex associated with the storage and processing of agricultural products.

The tasks that have been set are great and complex. The coordinated actions and the concentration of efforts by many scientific collectives, not only in agricultural science but also other scientific disciplines, are essential for their successful resolution.

Major scientific forces have been concentrated in Siberia. They are capable of solving the most serious scientific problems. This is evidenced by the development and completion of the kind of large-scale, comprehensive program exemplified by the "Sibir'" program. Speaking about the course of this program's fulfillment, the speaker stressed the need for even greater activity to coordinate the efforts of those participating in the joint research. He dealt in detail with questions

of training personnel for work in the east of the country and of strengthening the experimental-production for science.

Today, as we honor the Siberian Branch of the USSR Academy of Sciences with the award of an Order of Lenin, M.S. Solomentsev said in conclusion, we note with great satisfaction the atmosphere of principledness and goodwill, the desire for creative search, the readiness to give their best effort to resolve the tasks set by the party, that has become entrenched in the collective.

To the accompaniment of applause from those present M.S. Solomentsev affixes the award to the banner of the Siberian Branch of the USSR Academy of Sciences.

The president of the USSR Academy of Sciences A.P. Aleksandrov was given the floor. He expressed the conviction that the high assessment of the labor of the Siberian scientists will evoke a new flood of energy in the creative collectives. The award presented to the branch is yet another proof of the attention and concern that the party and government show for the development of science. The Siberian Branch of the USSR Academy of Sciences has been transformed into a major center for science in the east of the country and within its framework fundamental research that promotes intensification of the scientific and technical potential of the region and of the entire country and growth in the authority of Soviet science has been developed on a broad front. Work here has been truly creative, the speaker said. You are doing what is needed for our motherland.

Science has become one of the most important factors in the development of Siberia's economy. This was emphasized by A.P. Filatov, first secretary of the CPSU Novosibirsk obkom. For example, our oblast, having set a course toward the acceleration of scientific and technical progress and the introduction of the achievements of science and leading experience, has achieved all production growth in the national economy in the past 2 years through labor productivity growth. The collective of the Siberian Branch possesses the necessary creative forces, a clear plan of work for the future and a high sense of responsibility to the motherland.

G.I. Marchuk, deputy chairman of the USSR Council of Ministers and chairman of the State Committee for Science and Technology, spoke at the meeting. Having characterized the Siberian Branch as one of the world's largest scientific centers, he stressed that its creation has been accomplished by all the Soviet people. This great business was initiated by academician M.A. Lavrent'yev and other scientists who went to Siberia at the party's call. Generations of their colleagues and students have taken up the baton and are carrying it successfully. The speaker emphasized that science must promote the transfer to a fundamentally new course in the development of the economy--every possible intensification on the basis of scientific and technical progress. The development and introduction new technologies insuring highly economic production is playing an important role in this.

Those speaking at the meeting, including V.A. Koptyug, vice president of the USSR Academy of Sciences and chairman of the Siberian Branch, V.Ts. Naydakov, director of the Buryat Institute of Social Sciences, N.A. Logachev, presidium chairman of the East Siberian Affiliate, and others, expressed their sincere gratitude to the CPSU Central Committee, the USSR Supreme Soviet Presidium, the USSR Council of

Ministers and comrade L.I. Brezhnev, for the high assessment of the activity of the branch. The speakers expressed their assurances that the scientists of Siberia will devote all their efforts, knowledge and experience to the acceleration of scientific search, the further development of the region's production forces and the exploitation of its natural resources.

With great enthusiasm the meeting participants adopted a greetings letter to the CPSU Central Committee, the USSR Supreme Soviet Presidium and comrade L.I. Brezhnev.

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During his visit to Novosibirskaya Oblast M.S. Solomentsev participated in a scientific session devoted to the 25th anniversary of the Siberian Branch of the USSR Academy of Sciences and visited a number of the subdivisions in Akademgorodok and an exhibition of scientific work. He visited the instrument-building plant imeni V.I. Lenin and the "Tal'menskiy" poultry sovkhoz and familiarized himself with construction on the Novosibirsk metro and in the scientific village of the Siberian Branch of the USSR Academy of Medical Sciences.

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ACADEMICIAN KOPTYUG ON SIBERIA'S DEVELOPMENT

Moscow APN DAILY REVIEW in English 9 Jul 82 pp 1-9

[Article entitled: "Siberian Acceleration: Science and Practice"]

[Text] The Siberian Department of the USSR Academy of Sciences was established near Novosibirsk 25 years ago. The Department has been successfully tackling major economic issues ever since. Its staff has greatly contributed to the elaboration of numerous basic problems of science. Below is the interview Academician V. Koptyug, Chairman of the Presidium of the Siberian Department, granted to our correspondents. The interview deals with the sweeping transformation of Siberia, the role the Department played in carrying out tremendous development programs in Siberia and its plans.

* * *

QUESTION: This year, when the country celebrates the 60th anniversary of the formation of the Soviet Union, the Siberian Department of the USSR Academy of Sciences will turn 25. Don't you think that this coincidence is significant and symbolic because without the fantastic changes which have transformed the life of this taiga region since the October Revolution the "Siberian phenomenon" would have hardly been possible?

ANSWER: Of course, the tremendous transformations in the country could not but have spread to Siberia.

Siberia accounts for the bulk of the natural riches of the country: nearly seventy-five percent of the known resources of fuel (coal, oil and gas), a large proportion of the national stocks of non-ferrous ores, about half of the country's resources of timber and sweet water, and over half of its hydropower potential.

The plan-based development of the Siberian riches in the Soviet period has turned Siberia into an economically advanced region. The scientific and technical revolution is to ensure the unity of the science-technology-production triangle, with emphasis being made on the priority development of science. That was why the logic of the development of Siberia's productive forces necessitated the establishment of a major scientific center there. The Siberian Department became precisely such a center.

A huge region occupying ten million square kilometers, Siberia accounts for some 40 percent of Soviet territory. For the 25 years since its foundation the Siberian Department has been steadily developing this huge area, setting up its institutions, divisions and laboratories in Novosibirsk, Irkutsk, Yakutsk, Ulan-Ude, Tomsk, Krasnoyarsk, etc.

The Far Eastern Scientific Center of the USSR Academy of Sciences branched off from the Siberian Department 12 years ago. We have established our outposts in the form of divisions and laboratories in Barnaul, Kemerovo, Kyzyl, Omsk and Tyumen and are organizing a research institute in Chita.

I want to stress that the Siberian Department was formed to develop basic research and, on this basis, to solve applied problems crucial for Siberia economically.

Thus, the growing industrialization of Siberia made it necessary to study the behavior of materials at low temperatures. This major problem is of interest to many branches of science. It is particularly important for Northern Siberia because at heavy frosts metals become brittle, causing breakage and accidents and, as a result, putting machinery out of operation. That was why problems connected with materials behavior at low temperatures formed a major direction of the work of the Institute of the Physical and Technical Problems of the North in Yakutsk.

Another purely theoretical study, involving the flows of cosmic particles and their interaction with the magnetic field of the Earth and the upper atmosphere, is also under way in Yakutsk because many cosmo-physical processes assume a more vivid form in high latitudes and also because they produce a particularly adverse effect on the stability of radio links in the North.

The 26th CPSU Congress pointed to the need for the priority development of basic research. In this field, Siberian scientists have major achievements to their credit. Space prevents me from describing all of them even in short. That is why I shall only enumerate some of them: the development of the theory of cubature formulas in mathematics, the evolvement of new numerical methods to tackle the problems of mathematical physics and mechanics; the substantiation of the principles of building colliding electron-positron beam linear accelerators; the numerical and experimental modeling of such complicated phenomena as hurricanes, water sprouts and sand storms, and tornadoes; the registration of the specificities of the energy spectrum of cosmic rays by means of non-colliding shock waves; the modeling of the magnetosphere and ionosphere of the Earth, the development of the theory of catalytic reactions; the discovery of the influence the magnetic field produces on some chemical reactions and the evolvement of the theory of this phenomenon; the synthesis of a gene of a human hormone, angiotensine, which participates in the regulation of blood pressure, etc.

QUESTION: You have promised to tell us something about the Food Program to which special attention was devoted at the 26th CPSU Congress and the November 1981 Plenary Meeting of the CPSU Central Committee. What are the latest results in this field?

ANSWER: Geologists from the Siberian Department worked out a purely theoretical problem--the evolution of salt-bearing formations. The results received made it possible to approach the prognostication of deposits in a new way. Proceeding from the forecasts by Academician A. Yanshin, the Nepsky potassium fields were discovered in Eastern Siberia. These are probably the largest fields of their kind in this country and elsewhere in the world.

This has a direct relation to the Food Program because the yields of grain and other crops can be steeply raised in Siberia if we provide fields with mineral, particularly potassium, fertilizers.

I am speaking about Siberia because its agriculture develops practically without fertilizers. Per-hectare, Siberian fields receive a quarter of the quota of mineral fertilizers available in other regions of the country. That is why crop yields grow slower in Siberia.

Siberia needs a mineral fertilizer industry of its own and this means that it needs potassium and phosphate raw materials. The discovery of the Nepsky potassium fields has created the necessary raw materials base for potassium fertilizer production.

QUESTION: What about phosphates?

ANSWER: Siberia has small phosphorite deposits. It would be inexpedient to build major chemical plants there. Siberian scientists have formulated a new method of processing phosphorites. We call it the mechanical and chemical activation of phosphorites. Unlike the traditional methods, activation does not require sulphuric acid. Most importantly, it can be efficiently used at small mobile plants, instead of major stationary works. The new method justifies the development of small phosphorite deposits which were once considered as unpaying.

Raw materials for the production of mineral fertilizers have been found in Siberia. It is now up to the technologists to act.

QUESTION: The development of new high-yielding strains and breeds is a major goal of the Food Program. Siberian scientists have done much in this field. We have heard about new strains of wheat, rye, maize, soya beans, and sugar-beets developed in Siberia. Interesting experiments were staged in the Institute of Cytology and Genetics. What can be expected of these products?

ANSWER: Most of the new strains you mentioned were evolved by means of chemical and radiation mutagenesis, i.e., by influencing the heredity of crops. The new strains are high-yielding and non-ledging. Novosibirskaya-67 wheat which our scientists developed, using the radiation method, together with their opposite numbers from the Siberian Department of the USSR Academy of Agricultural Sciences, takes growing areas in Siberia.

The development of new strains continues. High-yielding winter wheats and ryes, evolved by Siberian scientists, are undergoing state tests. Our specialists have received a sugar-beet hybride which increases the harvest by 10-15 percent in terms of sugar.

Much interesting can also be said about new breeds. The Institute of Cytology and Genetics was the first to receive viable and highly fertile hybrides of the domestic pig and the wild-boar. It is important that these hybrides can be bred by the feed lot method. We have made first steps towards using the rich genetic fund of aboriginal breeds and wild animals. Further work in this field will proceed in Altai where a genetic center is being established.

QUESTION: The Food Program envisages measures for the effective storaging of farm produce. What is the Siberian Department doing in this connection?

ANSWER: My answer may seem strange, but high-energy physics can play an important role in this field. The staff of the Department's Institute of Nuclear Physics has developed a number of industrial accelerators and organized their small-batch manufacture. A radiation grain disinfestation techniques have been developed to employ these accelerators to control pests spoiling grain in storage.

QUESTION: These techniques rely on radiation. Are they not dangerous?

ANSWER: Our specialists conducted experiments at grain elevators in Novosibirsk and Odessa. The techniques are absolutely safe and very effective. The radiation treatment of potatoes prevents them from germinating and rottening and increases their yields.

QUESTION: The introduction of scientific achievements still meets with considerable difficulties. L. I. Brezhnev said at the 26th CPSU Congress that the application of scientific discoveries and inventions was the decisive sector of our daily work. It follows from what you have said that the Siberian Department has completed many important economic projects. What about their introduction in practice?

ANSWER: Our Department has shaped a multi-level system of interaction between science and practice. The top level goes to the preparation of technical and economic reports on major projects for the USSR State Planning Committee. Since the end of 1979 we have submitted 20 reports to this Committee. As a result of the work carried out by the USSR State Planning Committee, the State Committee for Science and Technology and sectoral ministries and departments, we have made a significant advance in introducing a number of projects into the economy.

In particular, important corrections have been made in the strategy of increasing the known resources of oil and gas and building up the raw materials base for the production of mineral fertilizers in Siberia.

QUESTION: You have told us about many research projects which have been, or are being introduced into the economy. Program Siberia has met with many comments on the part of the scientific community. This program covers Siberia's major economic problems. Would you kindly tell us about the implementation of some ideas of this program?

ANSWER: Work on Program Siberia made it possible further to strengthen the intimate contact between science and the economy under the 10th five-year

plan. Program Siberia units 40 goal-oriented scientific programs covering the study and effective utilization of Siberia's fuel and energy resources, minerals, biological resources, the protection of the environment, the solution of complicated technical and technological problems of the region and the formation of territorial-production complexes there.

The USSR's long-range integrated program for scientific and technical progress incorporates Program Siberia as a regional section.

The main directions of research under Program Siberia meet the tasks of the economic development of the country, its Eastern areas in particular. We must considerably intensify and expand research into a number of major problems. Proceeding from national interests, we further specified some goals of Program Siberia. Initially, Program Siberia was geared to the implementation of available projects. However, in time it became clear that this was not enough.

Take, for example, the production of liquid fuel from coal and gas, or the economic, ecological and social implication of the transfer of part of the run-off of Siberian rivers to the southern areas of the country.

To tackle these and other major problems, the Siberian Department has started indepth studies and is forming new scientific organizations for the purpose.

The bulk of the huge Kansk-Achinsk coal fields lies in the Krasnoyarsk Territory and the rest in the Kemerovo and Irkutsk regions. That was why the Institute of Chemistry and Chemical Technology was established in Krasnoyarsk to work out the scientific principles of new technologies to convert coal into chemical products. A complex institute, being established in Chita, will tackle problems related to the development of the Udokan natural resources which are very important for the country.

QUESTION: Mathematics plays an important part in the intensification of science. This refers, in particular, to the development of the theory of mathematics and its extensive use for applied purposes. Could you deal in brief with the projects of the Siberian mathematicians?

ANSWER: The Institute of Mathematics successfully develops research into the calculus of probabilities and the theory of differential equations. The schools founded by Academicians S. Sobolev, A. Alexandrov, L. Kantorovich and A. Maltsev have achieved outstanding results of world importance.

A very promising direction of modern science is the mathematical simulation of complicated processes and phenomena, which is a mathematical technology of a kind making it possible to intensify applied research and accelerate experimentation and design.

In this field Siberian institutes have accumulated considerable experience. Computing centers in Novosibirsk and Krasnoyarsk have carried out a great deal of work to develop control algorithms for intricate systems, for the processing of aerospace and geophysical information. The Department's

Institute of Theoretical and Applied Mechanics has produced packages of applied programs extensively used to blueprint pre-production models of new technology, helping us save much time and effort required by the tests of such models.

In the Department's computing center you will hear about a mathematical model of interaction between the atmosphere and the ocean, and the staff of the Siberian Power Institute will tell you about a model of an energy system. In the Institute of Catalysis you will learn about the models of chemical reactors, etc.

Mathematical technologists are very effective for handling tasks connnected with the computerization of research and development.

QUESTION: While in the Novosibirsk Institute of Organic Chemistry you became an initiator and director of a new branch of chemistry--the computerization of spectroscopy and chemical research. The projects carried out under your leadership to computerize the solution of the problems of organic chemistry are widely known in this country and abroad. Tremendous importance attaches today to the use of computers to improve the information backing of research. What can you say about this?

ANSWER: Computers help intensify research. The flows of information are growing in the various branches of science. They grow so rapidly that even a ramified network of sectoral and national scientific and technical information centers fails to satisfy the mounting requirements of users.

A network of automated information centers with data banks is being established. These centers will be united into a single computerized information system of the country. It will give users direct access to any data file. This system will greatly help raise the efficiency of researchers, engineers and technologists.

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PERMAFROST: ENEMY AND ALLY

Moscow APN DAILY REVIEW in English 2 Jun 82 p 1-5

[Article by Academician P. Melnikov, director of the Institute of Frozen Soils, Siberian Department, USSR Academy of Sciences and A. Pavlov, chief of a laboratory, D. Sc. (Geogr.), Yakutsk]

[Text] Everyone in this country has heard about permafrost, its specific features and sometimes a perfidious character. This is natural since permafrost spreads to vast areas, occupies a part of the Kola Peninsula and the mainland tundra, then descends along the Urals ridge and in Western Siberia reaches the latitudinal section of the Ob River, covering almost entire Eastern Siberia and the North-East.

The permafrost layer is hundreds of meters thick. In one of the regions of North-Western Yakutia the rocks with the temperature below zero centigrade lie to a depth of 1,450 meters. In the direction from the coasts of the arctic seas to moderate latitudes permafrost passes over from solid soil when only individual sections of nonfrozen rocks (the so-called taliks) are found to discontinuous and even islandic sections. A permafrost section can be found even in the Northern Caucasus, on the Razvilka mountain near Zheleznovodsk.

Even this cursory review shows the importance of studying the specific features of the frozen soils of vast regions in the interests of their economic development. The permafrost region contains a lot of deposits of gas, oil, diamonds, gold, coal, nickel, copper, tin and mineral fertilizers. At the same time, the North is rich in hydro-resources and timber reserves. Ever new natural resources of the eastern and northern areas of the Soviet Union are being tapped and will be tapped. For instance, the Neryungri deposit of coking coal and the Chara-Tokkin deposit of iron ores have put to the fore the problem of establishing another metallurgical base in the east. The stocks of the Seligdar apatite deposit run into thousands of millions of tons. The north of Western Siberia, including the shelf of the arctic seas, is rightly called an energy treasure-house. Large gas deposits have been discovered and exploited there.

The further development of the North will, of course, lead to man's interference in nature: the soil-vegetative layer, the microrelief, snow depositions, etc. are disturbed. This can not but influence the state of

permafrost. For instance, while thawing, soils turn into flowing mass uncapable of bearing the load of the groundworks of structures.

It can be said without exaggeration that the tapping of the North's natural resources and their rational use are impossible without the profound and comprehensive studies of permafrost as a natural phenomenon. Such studies are carried out by the Institute of Frozen Soils (Siberian Department, USSR Academy of Sciences) jointly with scientists from other research institutions.

Our laboratories conduct fundamental investigations aimed at a thorough analysis of the composition and structure of thick frozen soils and the regular features of their formation and development and also applied studies linked with the elaboration of the methods of influencing permafrost processes in man's interests.

Thermophysical line is one of the leading lines of the fundamental studies and extensive efforts are exerted and huge funds are allocated to develop them. Many permafrost phenomena on the Earth's surface are caused by the motion and transformations of energy and substance. Permafrostology as a science has emerged on the basis of thermal physics. The complex of thermal balance and geothermal observations opens up vast prospects for studying the specific features of the bedding and the evolution of seasonal and permanently frozen soils and is a guide in geothermophysical forecasts.

Thick frozen soils inherited from the climate, which existed on the Earth thousands and hundreds of thousands of years ago, have preserved the memory of the harsh situation of the past eras. Until recently the age of present-day frozen rocks in Yakutia was determined as 40,000 to 50,000 years. The datings made by palaeonthological and luminescent methods have shown that in Central Yakutia during temperature rises frozen rocks have never thawed fully over at least 300,000 years. It can be stated with confidence that the age of frozen rocks within the boundaries of their present-day spread is considerable: they could exist about 1 to 1.5 million years ago. For instance, the age of frozen rocks in Alaska and in Northern Canada is assessed by these figures.

Our institute has recently completed a number of regional permafrost studies, predominantly in the largest complexes of Siberia. The geography of such surveys is large: the zone adjacent to the Baikal-Amur Mainline railway (BAM), the gas-bearing provinces of the north of Western Siberia, the territory of the Yakutian industrial complex, the areas of the construction of big hydro-schemes and the alpine regions of Siberia and Central Asia.

Over the past few years the efforts of many of our researchers have been bent on studying the permafrost situation along the entire route of BAM from Ust-Kut to Komsomolsk-on-Amur. The studies have resulted in the publication of the map of BAM's zone which was awarded a medal of the USSR Economic Achievement Exhibition. Permafrostologists systematically prepare permafrost maps of various types. A survey in the area of the Chara-Tokkin iron ore deposit has led to the preparation of the geocryological map. A unique map of the permafrost-hydrogeological regionalization of Eastern Siberia has been

issued. Since 1980 preliminary studies have been started on the route of the projected Berkakit-Tommot-Yakutsk railway in which will be almost 900 kilometers long.

An extensive volume of studies is linked with the "Siberia" program. Some applied works have already been completed, and their results promise a high economic effect. For instance, jointly with the Yakutian Industrial Diamond Research Institute designs have been improved and methods of using liquid thermal siphons (thermal piles) of a seasonal action have been optimized.

A thermal siphon is a closed metal pipe preliminarily filled with a refrigerating medium (kerosene) and mounted in soil. Naturally in winter-time due to the circulation of the refrigerating medium the soil around the pipe is cooled or frozen more quickly. As a result, in the city of Mirny stone buildings up to nine stories high are erected on ferroconcrete pile foundations fitted out with thermal siphons. At the institute's recommendation thermal siphons have been used for strengthening the foundations of the pylons in laying power transmission lines across the Lena and for creating a watertight frozen screen in the back of earth-fill dams. This opens up vast prospects for their use in arcticized hydro-engineering and in the construction of the supports of ground gas pipelines.

Some other practical recommendations by our research associates can be mentioned. For instance, the institute has designed underground capacities built in permafrost by a special hydraulic washing or the electrical heating of water wells and hydrogeological wells. But we would like to specially mention the studies aimed at solving the food problem in Yakutia.

A cycle of studies aimed for optimizing the modes of the irrigation of meadows, pastures and fields with fodder crops has been completed. Recommendations have been made which will help land reclamation. These studies are also of importance for environmental protection.

Permafrostologists have extensive plans. Under the 11th Five-year plan minerals will be prospected on the vast expanses of the shelf zone of the arctic seas. This work will be carried out on a large scale. Scientists' task is to help prospectors and drillers to assess the contours of underwater permafrost and to ensure the drilling of wells in rocks on water expanese, for instance, by creating artificial ice or ice-soil islands. Scientists should make a weighty contribution to solving the problems of the North's hydroengineering as a basis for the further development of mining. Two-hydropower plants--the Vilyui and Ust-Khantai stations--have been built in permafrost conditions and operate efficiently. Feasibility studies of the choice of the dam sites and the design of a number of major hydro-schemes in the North are under way. The range of the problems to be studied is wide: the substantiation of the methods of laying gas pipelines across the territories marked by unstable frozen soils in the case of man's interference and, of course, the elaboration of the methods of environmental protection and the preservation of the North's vulnerable landscapes.

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SIBERIAN DEPARTMENT OF ACADEMY OF SCIENCES AWARDED

Moscow APN DAILY REVIEW in English 7 Jun 82 pp 1-2

[Article entitled: "Award Presented to Siberian Branch of USSR Academy of Sciences"]

[Text] NOVOSIBIRSK, June 5. TASS. The creation of a powerful scientific potential in the east of the USSR a quarter of a century ago became a striking example of the socialist society's tremendous possibilities in solving large-scale tasks.

The Order of Lenin was presented at a meeting here today to the Siberian branch of the USSR Academy of Sciences.

Addressing the meeting, Alternate Member of the Political Bureau of the CPSU Central Committee, Chairman of the Council of Ministers of the Russian Federation Mikhail Solomentsev conveyed to the entire collective of the branch heartfelt congratulations upon the high award of the Motherland and wishes of new creative accomplishments from the Political Bureau of the CPSU Central Committee and Leonid Brezhnev.

Noting the big accomplishments of the Siberian branch, Leonid Brezhnev stressed that these successes were a result of bold scientific quest and discoveries, of selfless work. He expressed confidence that the contribution by Siberian scientists to the development of national science, to the solution of the tasks set by the 26th Congress of the Communist Party would continue growing steadily.

Drawing special attention to the importance of the active participation of Siberia's scientific establishments in the fulfillment of the USSR's food program, Leonid Brezhnev wished the Siberian scientists successful and fruitful work in this nation-wide endeavor.

Assessing the accomplishments of science in Siberia Mikhail Solomentsev said:

"The efforts of your collective have resulted in major scientific developments and outstanding achievements in the theoretical and applied sections of mathematics and mechanics, nuclear physics and physics of semiconductors, quantum electronics, the theory and practice of catalysis, in the study of processes of burning and explosion, in works in the field of genetics and

selection. They are being applied with great usefulness in mining and machine-building, in agriculture, in the development of transport and communications. The USSR has risen to first place in the world in the output of oil and has achieved high indicators in the extraction of gas and reflected in this, no doubt, are the successes of the Siberian scientists, their fundamental studies in the field of earth sciences".

The big role of the Siberian branch in the development of Soviet science was noted by Guriy Marchuk, Deputy Chairman of the USSR Council of Ministers and Chairman of the USSR State Committee for Science and Technology, and by the president of the Academy of Sciences of the USSR Anatoly Alexandrov.

"We are all full of joy and pride, of gratitude to the CPSU and the Soviet government, to Leonid Brezhnev for the tremendous attention and concern for the establishment and development of Siberian science", Vice President of the Academy of Sciences of the USSR, chairman of the Siberian branch Valentin Koptyug stressed in his speech.

CSO: 1812/167-E (TASS, June 5. In full.)

TURKMEN ACADEMY OF SCIENCES ANNUAL MEETING

Ashkhabad TURKMENSKAYA ISKRA in Russian 15 Apr 82 p 1

[Turkmeninform report: "At the Forward Positions of Science"]

[Text] The scientists of Turkmenistan are working on the forward lines of Soviet science, on the most important problems of theory and practical application. Their research is making a large contribution to development of the nation's economy.

This was discussed at the annual general meeting of the Turkmen SSR Academy of Sciences which was held today.

The opening address was presented by USSR Academy of Sciences Corresponding Member A. G. Babayev, president of the TuSSR Academy of Sciences. He noted that scientists are working on 10 specific-purpose combined scientific programs of regional significance and are taking part in 16 scientific and technical programs of national significance.

In 1981 this republic's specialists submitted 40 scientific recommendations to various branches and sectors of the economy for adoption, 36 certificates of invention were issued, and 10 efficiency innovation proposals were submitted.

TuSSR Academy of Sciences Academician F. F. Sultanov, chief scientific secretary of the Presidium of the TuSSR Academy of Sciences, presented a report on the activities of the TuSSR Academy of Sciences in 1981.

The speaker emphasized that concern for the working man and for increasing our nation's might occupy the center of attention of the research being conducted by this republic's scientists. Research is being directed toward accelerating scientific and technological advances and creating material goods and spiritual benefits for Soviet citizens. Specialists from 14 subdivisions of the Academy of Sciences, branch institutes, and teaching faculty at higher educational institutions in Turkmenistan are conducting research on basic problems of the physical-mathematical, chemical, and biological sciences, the earth sciences, and pertinent problems pertaining to development of the Soviet society.

Implementation of recommendations by Turkmen and Uzbek scientists has helped boost the productivity of desert grazing lands and strengthen the feed base of

this republic's sheep raising. A team of scientists at the Deserts Institute was awarded a USSR State Prize for 1981 for this work. Solar energy units designed and built by specialists at the Solntse Scientific-Production Association and employed in various branches and sectors of the economy are highly economical and efficient.

The report noted the contribution made by Turkmenistan's scientists toward expanding the mineral and raw materials base, intensification of agricultural production, practical adoption of scientific research results in the area of health care, and improved reliability of earthquake prediction.

The speaker and subsequent participants in the debate also discussed the training of scientific cadres and closer cooperation with this country's scientific establishment.

M. Mollayeva, Central Committee secretary of the Turkmenistan Communist Party; V. Ye. Abramov, deputy chairman of the TuSSR Council of Ministers and chairman of TuSSR Gosplan; and Ye. Ovlyakuliyev, head of the department of science and educational institutions of the Turkmenistan Communist Party Central Committee, took part in the proceedings of the general meeting of the TuSSR Academy of Sciences.

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UKRAINIAN ACADEMY OF SCIENCES ELECTS NEW MEMBERS

Kiev PRAVDA UKRAINY in Russian 3 Apr 82 p 3

[Text] The Ukrainian SSR Academy of Sciences General Assembly on 1 April 1982 elected new full members (academicians) of the UkSSR Academy of Sciences and corresponding members of the UkSSR Academy of Sciences.

The following were elected full members (academicians) of the UkSSR Academy of Sciences:

in the Mathematics, Mechanical Engineering and Cybernetics Department Viktor Vasil'yevich Pilipenko and Vladimir Grigor'yevich Sergeyev;

in the Physics and Astronomy Department Mikhail Semenovich Brodin, Vladimir Vladimirovich Nemoshkalenko, Mikhail Pavlovich Lisitsa, Igor' Rafailovich Yukhnovskiy and Aleksey Grigor'yevich Sitenko;

in the Geology, Geochemistry and Geophysics Department Yevgeniy Fedorovich Shnyukov and Ivan Il'ich Chebanenko;

in the Biochemistry, Physiology and Theoretical Medicine Department Konstantin Sergeyevich Ternovoy and Valeriy Kazimirovich Lishko;

in the Economics Department Nikolay Grigor'yevich Chumachenko;

in the History, Philosophy and Law Department Arnol'd Nikolayevich Shlepakov; and

in the Literature, Language and History of Art Department Vitaliy Makarovich Rusanovskiy.

The following were elected corresponding members of the UkSSR Academy of Sciences:

in the Mathematics, Mechanical Engineering and Cybernetics Department Yuriy Nikolayevich Shevchenko, Pavel Ivanovich Nikitin, Fedor Kondrat'yevich Ivanchenko, Andrey Feofanovich Ulitko and Vitaliy Nikolayevich Shimanovskiy;

in the Physics and Astronomy Department Vadim Grigor'yevich Manzheliy, Ivan Stepanovich Gorban', Emanuil Ayzikovich Kaner and Leonid Nikolayevich Litvinenko;

in the Geology, Geochemistry and Geophysics Department Valdimir Konstantinovich Gavrish and Vasiliy Ivanovich Kityk;

in the Physico-Technical Problems of Materiology Department Pavel Stepanovich Kislyy, Vladimir Mikhaylovich Kudinov, Valentin Tikhonovich Cherepin and Mikhail Ivanovich Gasik;

in the Physico-Technical Problems of Power Engineering Department Yuriy Mikhaylovich Matsevityy, Vsevolod Viktorovich Vasil'yev, Konstantin Grigor'yevich Samofalov and Vladimir Yefimovich Tonkal';

in the Oceanology and Geography Department Aleksandr Dmitriyevich Fedorovskiy and Nikolay Petrovich Bulgakov;

in the Chemistry and Chemical Technology Department Sergey Andreyevich Andronati and Lev Ivanovich Antronov;

in the Biochemistry, Physiology and Theoretical Medicine Department Yekaterina Ivanovna Andreyuk and Mikhail Fedorovich Shuba;

in the Economics Department Valdimir Ivanovich Golikov; and

in the History, Philosophy and Law Department Ivan Ivanovich Artemenko.

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TURKMEN INSTITUTE COORDINATES SCIENTIFIC WORK RELATED TO DESERT LIFE

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 13 May 82 p 2

[Article by N. Chunakova: "A Hurricane to Order"]

[Text] As is usual in the desert, the hurricane began suddenly. There were gusts of wind. A blizzard with accompanying ground winds swept up. The tops of the dunes were a haze. And suddenly a black sandy whirlwind rose skyward. It immediately grew dark. It is frightening at such times in the Karakumy. Everything living freezes and hides....

"Once more, please," Agadzhan Gel'dyyevich Babayev said, and the fierce hurricane obediently obeyed the command. The point being that it was raging in a wind tunnel.

"This new device, which was assembled in the sand wind erosion laboratory, will help us under artificial conditions to study the patterns of the formation of the aeolian terrain under different wind forces and directions. And this is very important for the development of practical methods of protecting roads, canals, irrigable land and industrial facilities from sand drifts and wind erosion," A. Babayev, president of the Turkmen Academy of Sciences and director of the Institute of Deserts, explained.

The main scientific proving ground of Turkmen desert scientists is the Karakumy itself, and here, in 12 institute laboratories, the most important processes which compose the harsh and still largely enigmatic life of a great desert have been modeled and set out into constituent parts, as it were.

"Man must learn not only to coexist with the desert and protect himself against its cunning ways but also avail himself rationally and without disturbing the natural balance of its resources," A. Babayev emphasized. "However paradoxical it may sound, the desert is generous soil. But it only reveals its treasures to those who are not afraid of work and who spare no effort to understand the laws by which it has lived its life for many centuries."

To satisfy himself as to how much has already been done in this field the TASS correspondent was permitted to acquaint himself with the work being performed in the institute.

Large-scale photographs are displayed on stands in the plant ecology laboratory, where desert flora are studied and the possibilities of an increase in the yield of pasture vegetation are being investigated. Even knowing that they were taken 4-5 years ago, it is difficult to believe that the photographs show one and the same area of the Karakumy. The changes that have occurred are striking! The first photograph is of a wavy sea of sand dunes. The second is of young shoots of saxaul and sand-loving grass driving their way through them. The third shows us a real forest. Thus has the introduction of scientists' recommendations transformed the desert landscape.

Many important developments have emerged from behind the laboratory's walls. In cooperation with their Uzbek colleagues its assistants have created theoretical principles and practical methods of an improvement in desert pasture under the leadership of the well-known geobotanist N. Nechayeva. Pasture enriched with the additional planting of shrubs and perennial grasses is now used the whole year round.

"Apple trees may bloom in the desert also," the sand agroforestry improvement laboratory assistants claim by no means jokingly. The application of their developments helped not only assimilate hundreds of hectares of near-oasis sand tracts situated in the vicinity of irrigable land for fodder crops but also stabilize the dunes in many areas. And at the institute's South Karakumy base, 25 kilometers from Ashkhabad, the scientists are engaged in the creation of the agrotechnics of the cultivation in the sand of fruit and grapes.

The problem of problems for the desert is water. Irrigable farming is particularly profitable under Central Asian conditions. And although there is far from an abundance of fresh water here, the mineralized reserves are huge: approximately 5 million cubic meters of drainage water are discharged into the sand annually. The assistants of the water problems laboratory have proposed a technique which will make it possible to use it to water agricultural plantations.

"The desert is being enlisted increasingly in the economic turnover, and this is increasing to a tremendous extent the significance of the desert scientists' work," A. Babayev summed up. "Our institute coordinates the work of 80 of the country's research establishments in the development of the scientiric principles of the use of the resources of the desert. The recommendations which we pass on to the field workers intelligently combine techniques of farming and animal husbandry which have been employed for centuries and modern technical and scientific achievements."

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UZBEK ECONOMY FORESEES EXTENSIVE INDUSTRIAL GROWTH

Tashkent EKONOMIKA I ZHIZN' in Russian No 9, Sep 81 pp 41-43

[Article by V. Dubrovskiy, deputy chief, consolidated economic plan department, UzSSR Gosplan, and A. Shulakova, department chief specialist: "On the Main Axis: Effect of Scientific and Technological Progress on Accelerated Completion of Production Facilities"]

[Text] Vast production potential has been created in Uzbekistan. Fixed assets and working capital, which comprise a large percentage of its national wealth, today exceed 53 billion rubles. More than 60 percent of this total comprises fixed assets, which form the material foundation of production. Today there is an average of more than 13,000 rubles in fixed assets per worker employed in this republic's industry. And this figure is continuing to rise steadily.

A stewardly attitude toward public assets and the ability fully and purposefully to utilize everything at our disposal has become the core of the economic policy of the party and state. Intensification of the economy and improved work efficiency and quality have been and continue to be the main element of this policy. This means that production results should grow more rapidly than outlays on production, so that more can be produced while drawing comparatively small resources into production.

The way to achieve the stated goals lies in extensive utilization of the achievements of scientific and technological progress. In this republic more than 75 percent of the total volume of state capital investment will be spent on improving the production base in the 11th Five-Year Plan. This capital spending should ensure bringing on-stream more than 21 billion rubles of fixed productive assets. This is almost 50 percent more than in the 10th Five-Year Plan. During this same period accumulation of working capital will increase by 30 percent. Accelerated production renovation will greatly strengthen the material and technological base and will accelerate further growth and development of this republic's economy.

The problem of efficient utilization of fixed productive assets is today assuming primary importance. Precisely this was discussed at the 20th Congress of the Uzbekistan Communist Party. As was emphasized at the congress, this republic's achievements in development of the economy and accomplishment of

social tasks could be much more substantial if there were fuller utilization of the possibilities of scientific and technological advance, if production reserves were more aggressively brought into play, and if existing deficiencies were resolutely corrected. We still have many unresolved problems in this area.

Let us take such an indicator as production volume growth obtained by boosting labor productivity. In 1980 it averaged only 55 percent for the republic as a whole. What does this indicate? First of all that the capital-output ratio is improving slowly, especially at light industry and building materials industry enterprises. The reasons lie in incomplete utilization of production facilities, equipment downtime, losses of work time, low shift index, etc. As a result a large number of enterprises failed to meet the targets of the 10th Five-Year Plan.

Measures to improve efficiency of societal production on the basis of its comprehensive intensification are specified by the Basic Directions of Economic and Social Development of this republic for the 11th Five-Year Plan. In 1981-1985 labor productivity growth in industry is targeted at 23 percent, with labor productivity growth accounting for 80 percent of industrial output growth at newly built enterprises and 100 percent at already existing enterprises.

The practicability of targets pertaining to speeding up the rate of labor productivity growth in the branches and sectors of the economy is ensured first and foremost by measures specified in the plan to increase the technical equipment of production. The capital-labor ratio in industry will increase by more than 45 percent during the five-year plan.

Just as in the preceding five-year plan, labor productivity growth will be affected by total mechanization and automation of production processes, as well as a decrease in the number of workers engaged in manual labor. During the five-year plan more than 470 shops and 600 sections are to be totally mechanized just at industrial enterprises of republic and union-republic subordination, while approximately 800 mechanized conveyer flow lines and automated lines are to go into operation. A total of 138,000 workers will be shifted from manual to mechanized and automated labor.

Adoption of new equipment and industrial processes into the economy will generate approximately 606 million rubles of savings in the current five-year plan.

Scientific and technological advances will exert a qualitative influence on many branches and sectors of the economy. In this republic's power industry, for example, it will result in improvement in the technical-economic indices of power equipment. The output of steam-turbine units operating in supercritical conditions will increase. Their percentage share of the total inventory of installed steam turbines will increase from 41.8 to 46.8 percent in 1985. By bringing new power equipment on-line and modernizing existing power equipment, and by combining the processes of producing electric power and thermal energy, by the end of the five-year plan the specific consumption of standard fuel to produce 1 kilowatt hour of electricity will amount to 333.6 grams, as compared with 345 in 1980. This represents considerable savings.

Here is what is produced by acceleration of scientific and technological advances in the building materials industry. By 1985 projects are scheduled for completion at brickyards which will make it possible totally to eliminate manual labor in raw brick removal operations. Plans call for specializing the Bekabad Cement Combine in the production of asbestos-cement pipe, and the Akhangaran Cement Combine in the production of roofing slate. Movement on-stream of new facilities for the production of wall materials will make it possible to produce up to 800 million units of standard brick. Lime production facilities will increase in capacity. In connection with this existing enterprises will be renovated and expanded, and the Novodzhizak Lime Plant will be built, with an annual production capacity of 230,000 tons. The Chirchik Glass Plant will be renovated; in addition to standard window glass, this facility will be the republic's first to manufacture glare-reflecting tinted glass.

Equipment will double by 1985, while the total number of compressed-air, compressed-air rapier [pnevmorapirnykh] and microshuttle [mikrochelnochnykh] units will more than triple.

Facilities for the production of steel, mineral fertilizers, sulfuric acid, cement, machine building products, and consumer goods will be considerably better utilized. Coal mining facilities, facilities for the processing of natural gas, for producing refined copper, man-made fibers, AC electric motors, and power transformers will be 100-percent work-loaded.

Particular attention will be focused on achieving savings in material outlays. According to calculations such savings should exceed 320 million rubles. Plans call for achieving savings of 39,000 tons of ferrous metals, 108,000 tons of cement, 75,000 cubic meters of felled timber, 60,600 tons of automotive gasoline, and 137,600 tons of diesel fuel.

The establishment of associations promotes in large measure accelerated retooling of enterprises on a contemporary scientific and technological foundation. In the course of this process there has been an increase in the independence and responsibility of economic agencies for achieving long-range and current plan targets, the ability to handle production problems in a comprehensive manner, and to utilize for this purpose local production and scientific research establishments. Concentration in large complexes, under common administration, of a group of interrelated enterprises, scientific and planning-design establishments would make it possible not only to speed up modernization of production facilities but also more efficiently to utilize resources and better to organize worker labor.

This work will continue. The number of production, scientific-production, and agroindustrial associations and interfarm enterprises in union-republic and republic ministries and agencies will increase by 148 during the five-year plan and total 531, including 112 in industry. The percentage share of output produced by associations will comprise 36 percent of total production volume by the end of the five-year plan. And in the Ministry of Motor Transport the total volume of work performed will be done only by associations. This will be achieved by establishing stable, long-term economic ties and contracts.

The CPSU Central Committee and USSR Council of Ministers decree on improving the economic management mechanism specifies an entire aggregate of measures to secure further strengthening of the role of economic incentives and instruments to speed up scientific and technological advances. In present-day conditions, when the question of maximum shortening of time required to bring scientific and technical advances into production has been placed on the agenda, existing forms and methods of financing and stimulating scientific and technological advances are coming into conflict with one another. How is this manifested? During the period of bringing new equipment on-line, enterprises as a rule sustain higher material and labor outlays. This in turn worsens the indices of their current economic activities and reduces profit contributions to economic incentive funds.

Until recently such production costs were reimbursed with moneys from the new equipment start-up fund. The practical business of establishing and utilizing this fund, however, contained a number of significant drawbacks.

Pursuant to the decree, a unified science and technology development fund is to be formed on a normative basis in all industrial ministries and agencies from profit contributions. The USSR State Committee for Science and Technology, USSR Gosplan, and the USSR Ministry of Finance have ratified methods instructions on the procedure of forming and utilizing this fund. It is funded from contributions from the plan-targeted profit of scientific-production and production associations (enterprises) and organizations on the basis of standard amounts specified in five-year plans as a percentage of net (standard net) production.

The unified science and technology development fund is established for the purpose of financing scientific research, experimental design and industrial engineering projects and for reimbursing expenditures connected with the development and production start-up on new products, industrial processes, the adoption of scientific organization of labor, as well as additional expenditures to improve product quality and increased expenditures in the first years of manufacture of new equipment.

Industrial ministries (agencies) may make part of this fund available to all-union (republic) industrial associations and large production and scientific-production associations for financing measures pertaining to development of science and technology as specified by the plan.

Another important feature of this fund is the fact that it combines outlays both on scientific research activities and on startup of new equipment. This creates a good foundation for comprehensive financing of the entire "science-production" cycle and the requisite maneuvering of resources.

A general changeover to the new method of financing will promote acceleration of scientific and technological advances.

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UZBEK GOSPLAN OFFICIAL ON 'SCIENCE-PRODUCTION' CYCLE PROBLEMS

Tashkent EKONOMIKA I ZHIZN' in Russian No 1, Jan 82 pp 28-30

[Article by V. Dubov, deputy chief, Science and Technology Administration, UzSSR Gosplan: "Scientific Search: Components of Efficiency"]

[Text] In the new conditions of economic management specified by the 12 July 1979 CPSU Central Committee and USSR Council of Ministers decree entitled "On Improving Planning and Strengthening the Effect of the Economic Mechanism on Improving Production Efficiency and Work Quality," enormous importance is attached to strengthening the link between science and production, accelerating the rate of scientific and technological advance, improving the efficiency of scientific search, and improving management of the "science-production" cycle.

What is being done in this republic toward this end? What questions face us, and how should they be resolved? This is the subject of the following article by V. V. Dubov, deputy chief of the Uzbek SSR Gosplan Science and Technology Administration.

Our party considers improving the efficiency of societal production on the basis of all-out acceleration of scientific and technological advances to be one of the key problems of its economic strategy.

Priority in solving successive problems of the socioeconomic development of society is given to science and technology not by mere happenstance, for science, technology and production are essentially a single production line, the components of which cannot be examined outside their organic interrelationship.

Scientific discoveries are materialized in concrete hardware, new materials, instruments and equipment, which in turn make it possible to improve production processes and promote further development of productive resources. In principle this policy can and must be supplemented by an additional component -- "consumption" -- which is defined as utilization by society of the products of its activities.

Since science stands at the head of the "science-technology-production-consumption" cycle, it also receives primary attention. It is precisely scientific

advances in recent years which have made it possible substantially to broaden the scale of societal production and to intensify it, boosting the technological level and furnishing work stations with modern implements of labor.

What characterizes scientific and technological progress in our republic?

Let us take the most recent five-year plan. During this time 140 new types of machinery and equipment, apparatus and instruments were designed, and production start-up occurred on approximately 950 different items. Approximately 1200 mechanized flow lines and automated lines went into operation, more than 900 sections, shops and enterprises were totally mechanized and automated, and 144 automated control systems were incorporated. In agriculture new varieties of cotton, grains, melons and squash, and other crop plants were developed. Implementation of measures to incorporate scientific and technological advances has made it possible conditionally to eliminate approximately 35,000 jobs in industry alone, while overall savings exceeded 450 million rubles.

Comparing these and other indices with the preceding period, one can note a significant growth in the rate of scientific and technological progress, grounded on the firm foundation of science. And if we state that today the republic possesses a modern machine building industry and nonferrous metallurgy, petrochemical and electronics industry, large-scale production of mineral fertilizers, and a strong agriculture, we must note the vast role of scientists in all this. Their investigations in the field of physiology, molecular biology, genetics and selective breeding have made it possible substantially to boost the productivity and disease resistance of cotton. The new fertilizers they have developed, with trace element complexes, as well as effective herbicides have helped boost agricultural crop yields.

A new low-temperature process for producing cement, developed by scientists at the NIIStromproyekt [Scientific Research Institute for Building Materials Design] Institute makes it possible to boost the output of basic equipment by 50 percent and to reduce fuel and electricity costs by one third. This innovation has been registered as a discovery, which characterizes the level at which the scientific research was being conducted. In other words, this republic's scientific and technological potential is sufficiently large for successful accomplishment of economic tasks. But there are also difficulties in fully realizing this potential. Hundreds of establishments in this republic are conducting scientific research. Tens of thousands of persons are employed in the area of scientific research and development of new equipment and industrial processes, and almost half of these are scientific and scientific-teaching personnel. This is a vast resource, but it is far from being adequately utilized.

Scattering of scientific manpower and material resources, an excessively large number of different research topics, unwarranted duplication, and a lack of adequate coordination of scientific research have become a common ailment. Here is just one fact: up to 40 percent of scientific research projects completed each year wait for a long time for practical adoption or are not put to practical application at all. If one considers that each year up to 50 million rubles are allocated for the conduct of applied scientific research, 20 million of this is "mothballed" without yielding a return on investment.

Scientific quest proves inefficient: time, intellectual energy, funds, and resources are expended, with zero "output." And not simply zero, but a negative quantity if one considers the end result -- improving the level of prosperity of society. Where do the roots of this phenomenon lie?

They lie in the fact that a number of economic, organizational, legal and other problems of varying significance and complexity have not been resolved.

Take financing, for example. At the present time as a rule it is not research topics which are financed but rather scientific research and design organizations, within the limits of an overall amount of expenditures approved by a higher agency. Oversight over the direction of utilization of funds is immediately lost. As a result, with a large number of research topics, financing continues even when they are not fully completed or completed on schedule.

On the other hand, planning by a scientific establishment of volume of expenditures "according to achieved level," proceeding from average annual number of employees and expenditures per employee, limits possibilities to expand and develop new, promising areas of scientific investigation.

Finally, the relatively high percentage share of budget allocations and a lack of coordination between financing and the end result of the activities of the branches and sectors of the national economy, especially with profit, diminish the responsibility and limit the initiative of scientific organizations, and make maneuvering of funds difficult.

There is a lack of "ruble control" and material incentive to improve efficiency, while work quality remains a relative term, for no matter how or how much one works, there will be money available.

Pursuant to the CPSU Central Committee and USSR Council of Ministers decree entitled "On Improving Planning and Increasing the Influence of the Economic Mechanism on Improving Production Efficiency and Work Quality," scientific research organizations, experimental enterprises, and scientific-production associations have been converted over to an economic accountability system as regards designing, producing, start-up and incorporation of new equipment on the basis of work orders. Here also, however, where it would seem that economic accountability should make the financial framework more rigid, funds are often spent with surprising ease. Scientific organizations seek to acquire a "complete layout" and the most unique, custom-built equipment, paying no attention to the degree of work-loading of that equipment.

We must note that the complexity of the problems facing us demands continuous improvement and a rise in the level of organization of solving them. Let us take, for example, specific-purpose scientific and technical programs.

A specific-purpose scientific and technical program is first and foremost a form of link between science and production, aimed at improving work efficiency at all stages -- from the birth of an idea to its material embodiment in the nation's economy. It is an aggregate of tasks, jobs, and measures, coordinated on the basis of resources, executing agencies and timetable, directed toward solving a major problem of development of science and

technology, specified by a comprehensive program of scientific and technological advance and by the basic directions of this country's economic and social development for a 10-year period. Such programs are a most important instrument for implementing party and government scientific and technical policy. Complex economic problems, frequently standing at the junction between different sciences, are presently being resolved in this republic with their assistance: the development and adoption of new varieties of cotton which are significantly superior to existing varieties in a number of economically valuable attributes, development and adoption of a republic automated economic management system, plus many others.

At the same time, as practical experience shows, in order to achieve further improvement in the effectiveness of specific-purpose scientific and technical programs, it is necessary to establish a system of standards which make it possible with an adequate degree of reliability to distribute tasks, material-technical, labor and financial resources among program executing agencies.

Establishment of such standards is entirely feasible, for in projects of an applied nature more than half of the job elements are repetitive and are amenable to consolidated standardization.

Particular importance has been acquired by the question of establishing time and expenditure standards -- in other words, "capacities" -- in the "science-production" cycle. A great deal in work performance depends on correct distribution of "capacities" among scientific, design, engineering, and planning organizations, experimental facilities and subdivisions of enterprises putting new equipment into operation, that is, among all project participants.

Ways to increase the effectiveness of quest are of course not limited solely to specific-purpose projects. And alongside problems of the "highest category," so to say, there also exist problems which are smaller in scale but are extremely important, for an individual branch of industry, for example. How is the question resolved here?

First of all, we have a changeover to the economic accountability system of organization of work involved in development, adoption and start-up of new equipment and changeover of scientific research, design and engineering organizations to a system of settlement of accounts for a fully completed job which has been accepted by the client, in place of stage-by-stage payment for work performed.

The experience of the Ministry of Electrical Equipment Industry, the Ministry of Heavy and Transport Machine Building, the Ministry of Power Machine Building, the Ministry of Tractor and Agricultural Machine Building, and other machine building ministries has confirmed the high degree of efficiency of the new system, which speeds up its influence on technological advance.

Also quite effective are scientific-production associations, which include a scientific research institute, a design organization, an experimental production facility, and an industrial enterprise. Unification of all components of the science-production process within the framework of a scientific-production

association makes possible not mechanically, but economically and organizationally to create an integral scientific-economic complex, which sharply accelerates the process of adoption of new equipment into production. This is indicated in particular by the operating experience of the Tekhnolog, Signal, Kibernetika, and other scientific-production associations established in this republic.

In addition to the forming of scientific-production associations, there is becoming increasingly more widespread in Uzbekistan the practice of signing business contracts and scientific-technical cooperation agreements, work on a unified technical development plan, and organization of creative teams to carry out a scientific-technical project and incorporate its results.

Practical experience will also show the effectiveness of other forms of link between science and production and will suggest other organizational forms of management of science. The main thing, as was pointed out at the 26th CPSU Congress, is to determine continuously and in a timely manner and to change the direction of research and development and the organizational structure of scientific establishments in conformity with the demands of the scientific and technological revolution. Herein lies a guarantee of increased effectiveness of scientific search.

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MEASURES TO INTEGRATE GEORGIAN SCIENCE, PRODUCTION

[Editorial Report] Tbilisi KOMUNISTI in Georgian on 9 June 1982 has a 2900-word front-page editorial concerning the results and the import of the Sixth GCP CC Plenum held in mid-May to discuss ways and means to integrate science and production. Shevardnadze's speech at the plenum was published on 5 June after being prepared by the GCP CC Buro in order to incorporate Shevardnadze's concluding remarks, various suggestions and proposals, and other materials; the whole now serves as a basic document for widespread dissemination and thorough study by all concerned. Some stress is laid on the fact that the scope of the program thus mapped out goes "beyond the borders of the GSSR itself" and depends on all-union organizations, many representatives of which took part in preparations for the plenum and in the work of the plenum itself. Examples are cited of successful link-ups between science and production, although there are numerous organizations and sectors in which executives fail in this regard; manual labor, for instance, is still too high in many places. More practical scientific results are needed in fuel/energy, transport, and communications. Payback [otdacha] has been inadequate.

The integration of science and production must go hand in hand with integration of the party system that supervises it. Organizer of this endeavor must be the republic coordination council, headed by the GCP CC First Secretary and made up of sector working groups headed by the appropriate Buro members. Finally, the editorial urges full involvement of the primary party organizations, in particular the individual leaders of them, with reference to the republic primary party organization meeting held in April.

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